

modern machine shop

FINISH MACHINING
PARTS PRIOR TO
HEAT TREATING

See Page 96

PROCESS ALLOWS
WIDER USE OF
ALLOY STEEL

See Page 100

AUGUST 1960



10 Micro-inch Tracing at Constant Surface Speed... p 48-49

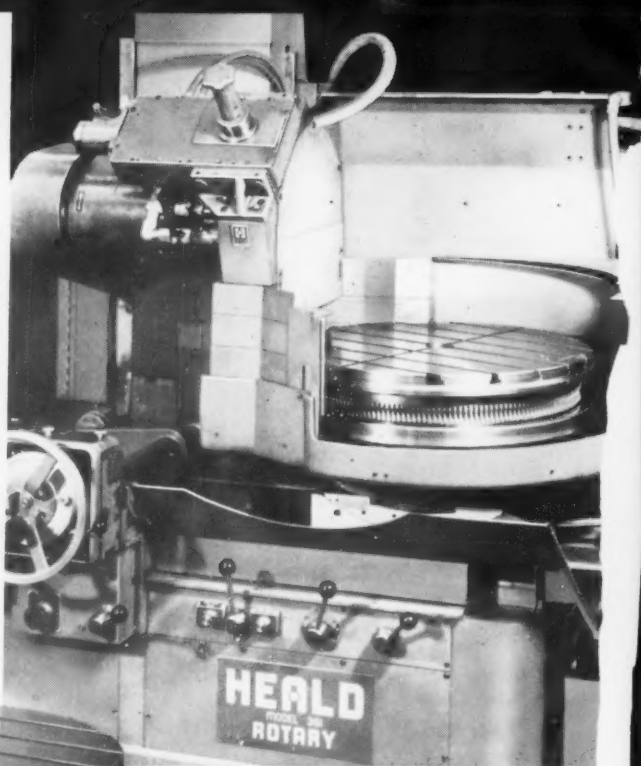
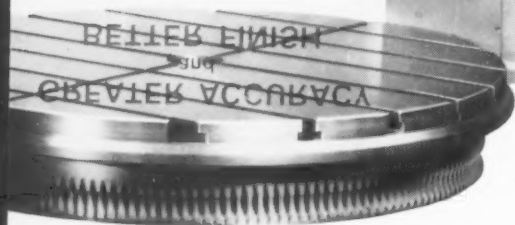
30" HEALD ROTARY

surface grinds

rotary index tables

with

GREATER ACCURACY
and
BETTER FINISH



*... and up to
five times faster, too!*

ON this Heald Model 361 30" Plain Rotary Surface Grinder, rotary indexing tables for other high-precision machine tools are ground flat and parallel within .0002", and to a surface finish of 15 micro-inches or better. Cast iron tables from 10 to 30 inches in diameter are easily handled, as well as a variety of miscellaneous parts.

Although high production was not a requirement, this Rotary enabled parts to be finished up to *five times faster* while obtaining greater accuracy and better finish than could

be obtained with previous methods.

An adjustable wheel dresser built into the wheel-guard permits truing the wheel without resetting the wheelslide or moving the table. And a demagnetizing switch facilitates setup and unloading.

Heald offers a complete line of high-precision rotary surface grinding machines with chuck sizes from 6 to 30 inches and either manual or automatic reciprocation. Ask your Heald engineer for complete details, or send for a copy of Bulletin 2-361-1 Issue 2.

It PAYS to come to Heald



THE HEALD MACHINE COMPANY

Subsidiary of The Cincinnati Milling Machine Co.

Worcester 6, Massachusetts

Chicago • Cleveland • Dayton • Detroit • Indianapolis • Lansing • Milwaukee • New York • Philadelphia • Syracuse

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modern machine shop

The
Idea-Full
Magazine

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Vol. 33, No. 3, August, 1960

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Member



A Statement of Policy

The principal function of MODERN MACHINE SHOP is to search out and disseminate the best and newest ideas for the advancement of engineering skill and mechanical efficiency in the metalworking industry, and neither effort nor expense is, or shall be, spared in the performance of this task.

FEATURES

AUGUST 1960

FINISH MACHINING CRITICAL PARTS PRIOR TO HEAT TREATMENT

By Gilbert C. Close

The relatively high drawing temperature of a metal alloy is being exploited to finish machine aircraft fittings before heat treating.

Page 96

PROCESS OPENS WAY TO WIDER USE OF AN ALLOY STEEL

By John F. Beck

When machine parts of intermediate strength levels or hardness values are required, alternate alloy steel may provide the answer.

Page 100

HIGH TEMPERATURE WORKING OF MOLYBDENUM AND TUNGSTEN

In its unique new InFab (Inert-Fabrication) facility, Universal-Cyclops Steel Corporation, Bridgeville, Pennsylvania, has started producing refractory metals of unusually high integrity for future hypersonic aircraft and aerospace weapons. These materials offer great promise for applications requiring high strength at ultra high temperatures.



Page 104

"PACKAGED HANDLING" PLAN REDUCES PARTS DAMAGE

Simple, inexpensive wooden devices for in-plant handling of small gas turbine parts cut costs by saving time and reducing parts damage at Boeing Airplane Company, Seattle, Washington.

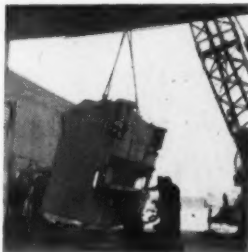
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in this issue

VOL. 33 • NO. 3

THE MACHINE TOOL EXPOSITION—1960

Advance information is presented regarding the great event of the metalworking world, The Machine Tool Exposition—1960, to be held by the National Machine Tool Builders' Association at the International Amphitheatre in Chicago from September 6 through 16.



Included are floor plans of the Amphitheatre, showing company booth locations and numbers, as well as a list of the exhibitors which will be at The Machine Tool Exposition—1960.

Page 108

PRODUCTION ENGINEERING SHOW

"Automation, the Key to Manufacturing During the 1960's" will be the theme of most exhibits at the Production Engineering Show to be held at Chicago's Navy Pier from September 6 through 16, concurrently with The Machine Tool Exposition—1960. Presented in this issue is a list of companies that will have exhibits at the Production Engineering Show, as well as complete floor plans of the Navy Pier, showing booth locations and numbers.

Page 122

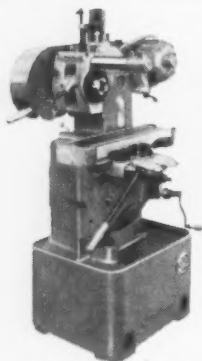
SECOND INTERNATIONAL COLISEUM MACHINERY SHOW

Numerous imported machines will vie with the finest in American-made equipment at the Second International Coliseum Machinery Show to be held in Chicago at the Coliseum from September 7 through 15. Presented herein is a tentative list of exhibitors that will be at this show, as well as a floor plan of the Chicago Coliseum, showing booth locations.

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modern machine shop

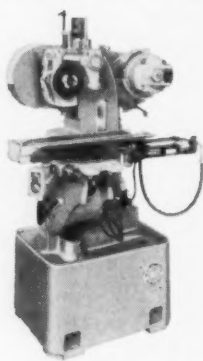
NICHOLS - The Millers That Use Their Heads



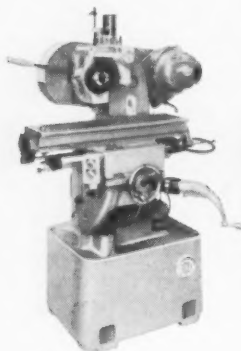
STANDARD MODEL—A precise, versatile Hand Miller with Rise and Fall spindle. Table size 6 $\frac{1}{2}$ " x 21".



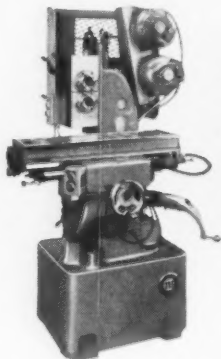
TOOL ROOM MODEL—Large 8 $\frac{1}{2}$ " x 30" table equipped with Micro Screw and Lever Feed. Extremely accurate and adaptable.



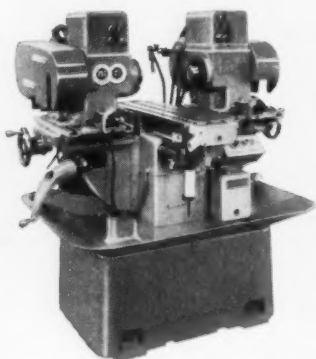
65A SEMI-AUTOMATIC—Automatic pneumatic table feed converts Standard Model to a fast high production unit.



65A SEMI-AUTOMATIC—Large 8 $\frac{1}{2}$ " x 30" Table on Heavy Duty Knee extends work and tooling range.



DOUBLE-DECKER—One of several duplex models for long run production. Hand feed or automatic table cycling.



TWIN MILL—An amazingly versatile machine. Twin milling Heads completely independent and adjustable.

NICHOLS Millers are known everywhere for great accuracy and versatility in small parts milling. Combinations of synchronized automatic feeds, Vertical Heads, and a broad selection of attachments available. Send for free literature. A NEW sound-color motion picture shows machines ingeniously tooled for automatic production. Available for free showing. May we reserve it for you?



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THE ROBERT E. MORRIS COMPANY

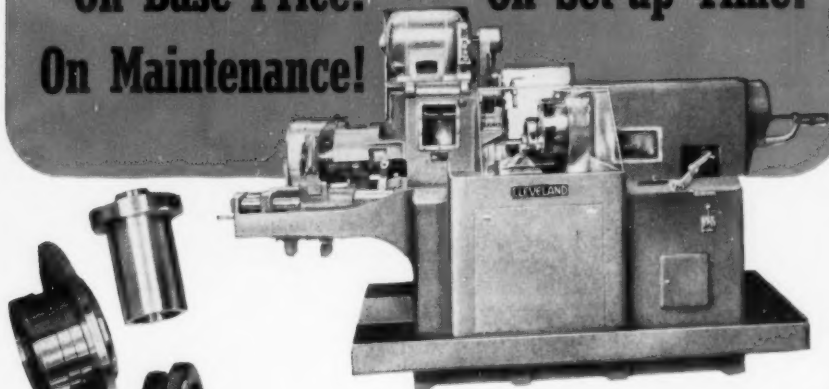
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SAVE

On Base Price! On Set-up Time!
On Maintenance!



with the low-cost **CLEVELAND** 2½" model AW single spindle automatic

With a base price of \$4000 to \$5000 less than other comparable automatics, this Model AW Cleveland will set an unbeatable production pace in your shop. Not only is it fast, precise and highly versatile, it is a rugged, fool-proof automatic, free from complicated mechanisms and controls that require constant adjustment and maintenance.

Quick and easy to set up, this Cleveland features universal camming — rapid, hand crank stock feed adjustment—quick change collet pads—four automatic spindle speeds for each set of

pick-off gears. An easily accessible tooling area is provided by wide, independent double cross slides and large diameter 5-hole turret. Forty spindle speeds —69 to 1920 rpm—give you efficient speeds for all types of materials and tools. Forward and return turret tool feeds are infinitely variable through a simplified mechanical drive.

With the 2½" Model AW Cleveland, you can cut your costs three ways:—ON BASE PRICE—ON SET-UP TIME—ON MAINTENANCE. For detailed machine specifications, write for AW Bulletin.

Typical parts produced by 2½" Model AW Cleveland, at profitable production rates, with simple tooling. Ask your CLEVELAND representative to submit a cost analysis with production estimates on your work.

REMEMBER,
Clevelands Cut Costs!

Sales Offices: Chicago • Cleveland • Detroit • Hartford • Springfield, N. J.

CLEVELAND

AUTOMATIC MACHINE COMPANY

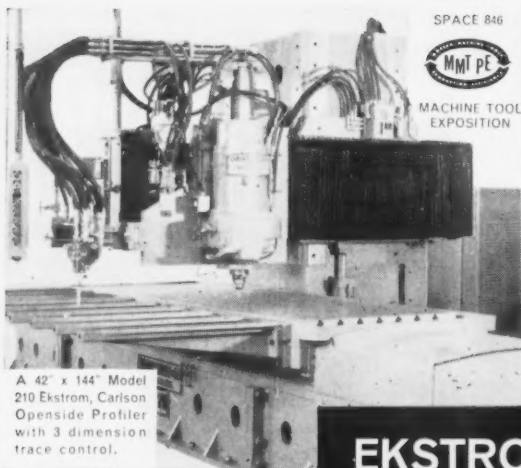
4940 Beech Street • Cincinnati 12, Ohio

Single Spindle Automatic Screw Machines and High Pressure Hydraulic Die Casting Machines

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August, 1960

MODERN MACHINE SHOP 5

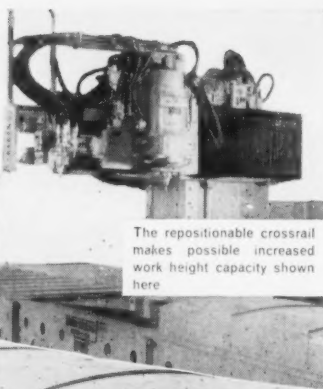


A 42" x 144" Model 210 Ekstrom, Carlson Openside Profiler with 3 dimension trace control.

SPACE 846



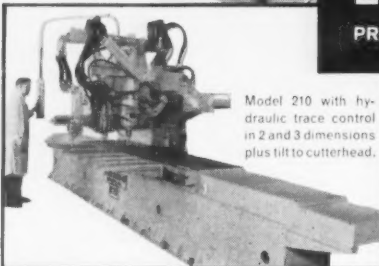
MACHINE TOOL EXPOSITION



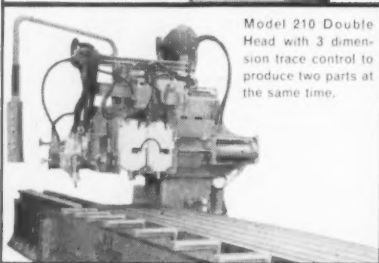
The repositionable crossrail makes possible increased work height capacity shown here

EKSTROM, CARLSON

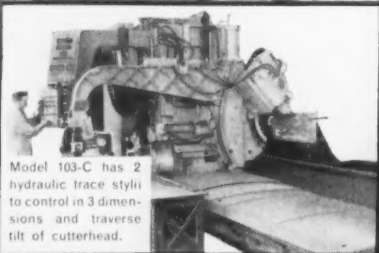
PROFILE AND CONTOUR MILLING MACHINES



Model 210 with hydraulic trace control in 2 and 3 dimensions plus tilt to cutterhead.



Model 210 Double Head with 3 dimension trace control to produce two parts at the same time.



Model 103-C has 2 hydraulic trace styli to control in 3 dimensions and traverse tilt of cutterhead.

... from small to large

**Openside or Bridge Type
Stationary or Traveling Table
Vertical or Horizontal
Single or Multiple Spindles**

**... with Manual or Automatic Trace
and Numerical Tape Control, too!**

Yes, whatever your profiling or contouring requirements are there is an EKSTROM, CARLSON Profile Milling Machine (either standard or tailored to suit your special need) that will do your job with utmost efficiency.

Shown here are only a few of our Openside Model 210 Machines and the Model 103-C Traveling Column Horizontal Spindle Machines.

WHY NOT ask for a representative to call and tell you the whole story on these and other EKSTROM, CARLSON high quality Profile Milling Machines.

EKSTROM, CARLSON & CO.
1414 RAILROAD AVE. ROCKFORD, ILL.

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GAY-LEE

CARBIDE TIPPED

* THINSAW



* Carbide tip has circular seat that provides more brazing surface, positive seating and greatest holding strength. Patented, Manufactured under license.

Engineered to Precision Limits . . .

Production slow? Here's a saw that's ideal for fast precision slitting, slotting, or sawing. The Gay-Lee Carbide "Thinsaw" features patented long-wearing Carbide tips. These tips are securely set into a specially designed seat providing extra brazing area and maximum tip security and cutting strength.

The Carbide "Thinsaw" is made wafer thin for delicate work yet maintains positive alignment for full depth cutting without runout.

They are available in any grade Carbide with thicknesses as low as .030". They are ideal for cutting all non-ferrous metals and plastics. A Gay-Lee Carbide "Thinsaw" lasts longer than ordinary saws and saves costly production time by reducing the need for frequent re-sharpening.

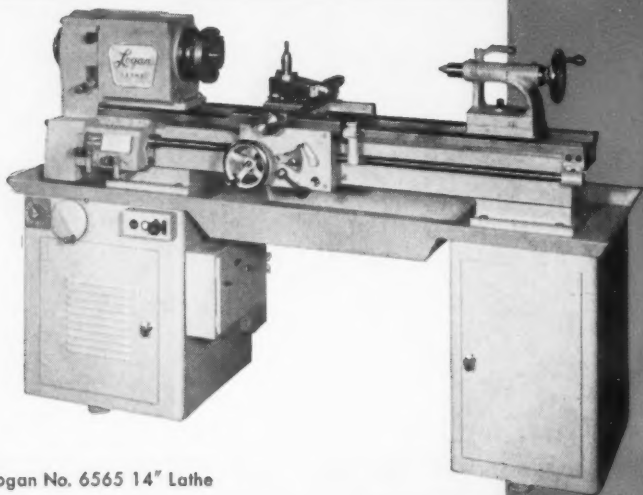
The next time you need a particular saw for a precision job, try a Gay-Lee Carbide "Thinsaw", they're engineered for production work to extreme precision limits.

Standard the world over . . .



its specifications add up
to high production capacity

Logan 14" Lathe



Logan No. 6565 14" Lathe

Logan designs greater reliability and accuracy, and longer life into its lathes by a generous combination of high-capacity features. For instance—

- An oversize spindle with 1½" bore turns on four super-precision ball bearings with built-in preload
- A variable-speed drive lets you change speed while work is turning—without shifting belts
- A warp-free lathe bed with high, strong walls braced by oversize ribs to withstand heaviest stresses; two V-ways and two flat ways are flame-hardened and precision-ground.

There are many more reasons why this and other Logan Lathes have a greater capacity. The complete specifications tell the story. Write for them.

- Spindle speeds to 2000 rpm
- 1½" Levermatic collet chuck capacity
- 14½" swing over bed
- 9" swing over saddle cross slide
- 40" between centers

LOGAN ENGINEERING CO. Dept. L-860, 4901 Lawrence Avenue, Chicago 30, Illinois
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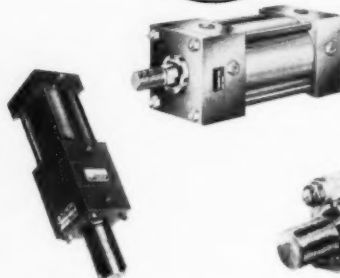
depend on



for speed and performance
with trouble-free operation

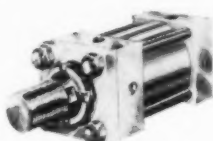
Standard Air or Oil Cylinders

Feature brass tubes to eliminate corrosion; precision honed for smooth dependable power at low or high speeds. Rated 200 psi air, up to 500 psi oil or water; 23 mounting types; 11 bore sizes: 1 1/2" through 14". Full data in Catalog 110C.



Air-Oil Boosters

Uses line air to provide intensified hydraulic power, easy to vary and control for many production operations; need no maintenance, hold intensified pressure as long as need with no added power consumption; save air, space. Full data in Catalog 116.



High-Pressure Hydraulic Cylinders

Ruggedly built for smoother, more precise power; interchangeable; 23 mounting styles; 12 bore sizes—1 1/2" thru 12"; Rated: 2000 psi (3000 psi non-shock). See Catalog 117.

Heavy-Duty Air-Hydraulic Cylinders

Proven for automation, widest use; air or hydraulic—no modification; extra large ports for extreme high speeds, minimum pressure drop. Rated: 200 psi air; 1000 psi hydraulic; 9 bore sizes—1 1/2" thru 8". See Catalog 115.



Power Chucks

S-P Self-Centering and Compensating Chucks are installed as original equipment by leading manufacturers. Ruggedly built for increased speeds, heavier feeds with greater grip; 2 or 3 jaws; American Standard or serrated; sizes — 6" to 18". Write for Catalog 112.



Rotating Cylinders

Original equipment on famous machine tools. Bore sizes for air: 3" through 16". For hydraulic: 3" through 8" and larger. Speeds up to 3600 R.P.M. Send for catalogs —air or hydraulic.



ALSO

- CONTROL VALVES
- DRILL PRESS CHUCKS
- EXPANDING ARBORS
- PARALLEL GRIP COLLET CHUCKS
- ACCESSORIES

A-2637A

THE S-P MANUFACTURING CORPORATION

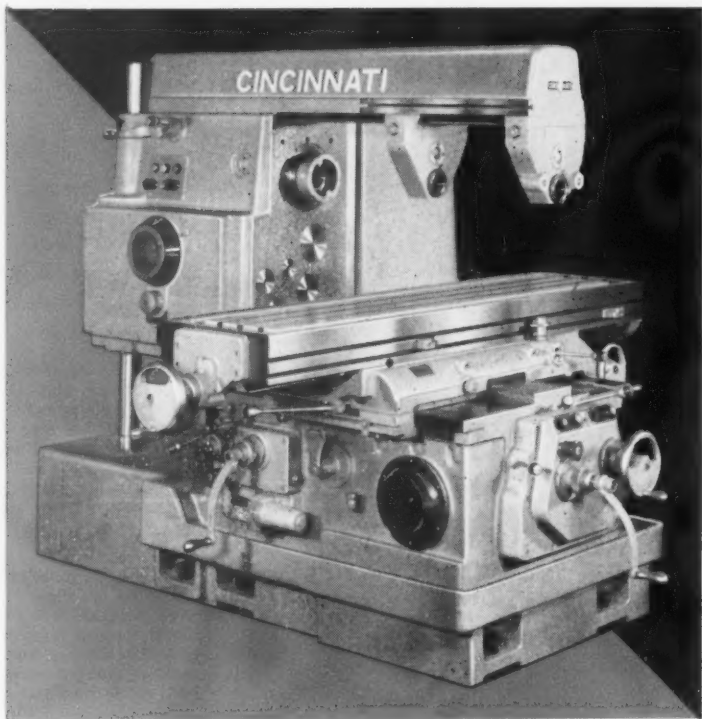
A BASSETT COMPANY • ESTABLISHED 1916

30201 AURORA ROAD • CLEVELAND 39, OHIO



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NEW *VERCI POWER*



LOW-SLUNG AND POWERFUL, the new VerciPower offers unusual flexibility for toolroom and production milling. It is available in four sizes: 20 or 30 hp, 34" or 42" table travel, each with 22" vertical travel of spindle carrier. Catalog No. M-2130.

BUILDERS OF FINE MACHINE TOOLS: KNEE TYPE AND BED TYPE MILLING MACHINES • DIE SINKING MACHINES •
THE CINCINNATI MILLING MACHINE CO., CINCINNATI 9, OHIO

ALL-PURPOSE MILLING MACHINE VERSATILE...POWERFUL...FAST

VERCIPower pioneers a unique new design. It combines the tool-room flexibility of knee types with the rigidity and cutting capacity of manufacturing and bed type machines.

Low-slung powerful construction is the key to VERCIPower's inherent ruggedness. Saddle and table move directly on the machine bed of convenient fixed height—there is no movable knee. Vertical movement is provided by the spindle carrier. Hardened ways, narrow guides and square gibbing on both bed and headstock maintain the original built-in accuracy for years. And consider these many other feature-advantages:

- Dual operating controls, front and rear
- Fixed table height of 39"
- Exclusive Arbor-Loc spindle nose
- Table traverse handwheel at front
- 24 spindle speeds and 32 feed rates
- Automatic Backlash Eliminator
- Dynapoise overarm for damping self-excited chatter
- Automatic table cycles—standard equipment on all sizes

VERCIPower is a new mighty work horse, expertly designed and equipped to handle a great variety of your milling operations. May we give you more information? Write for new catalog M-2130, or a visit by one of our field men.



Booth No. 1034

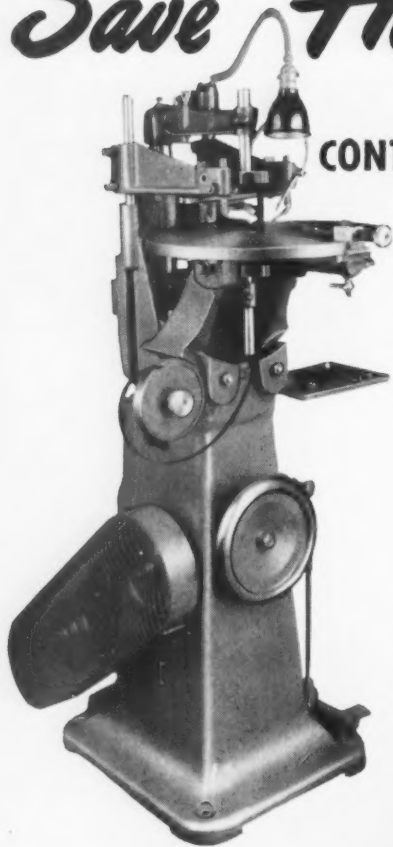


CUTTER AND TOOL GRINDERS • ELECTRICAL DISCHARGE MACHINES



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Save Hours in tool rooms and die shops with **CONTOUR SAWING AND FILING**



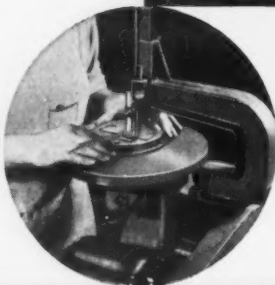
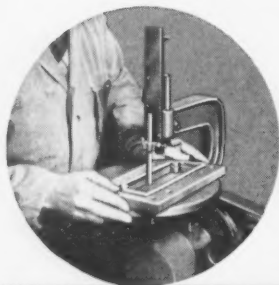
You can save real time and money in the production of parts for jigs and fixtures, dies, gages, templates and special machine production by using an Oliver of Adrian contour sawing and filing machine.

The Oliver is so simple to operate that all sawing, filing and lapping can be handled by an ordinary mechanic—saving a skilled die maker's costly time. Parts can be shaped to dimension faster, more accurately with no hand filing or semi-finishing operations. Available in five types—bench or pedestal. Write today.

OLIVER of ADRIAN

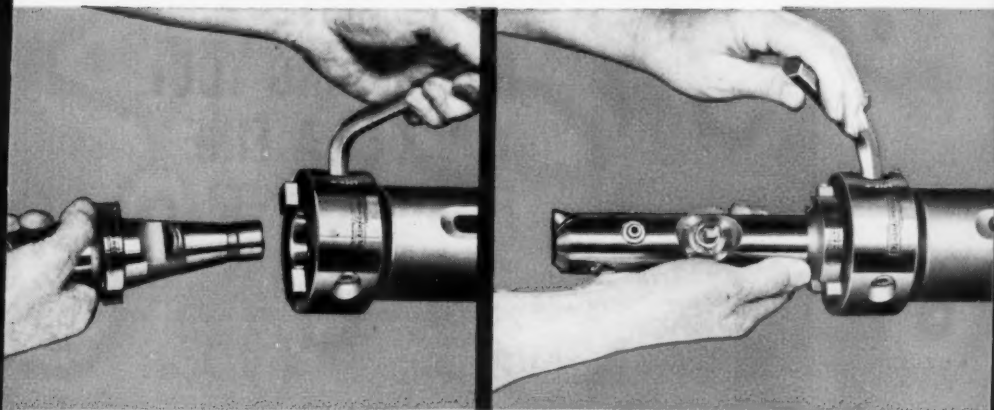
OLIVER INSTRUMENT COMPANY

1430 E. Maumee St. • Adrian, Michigan



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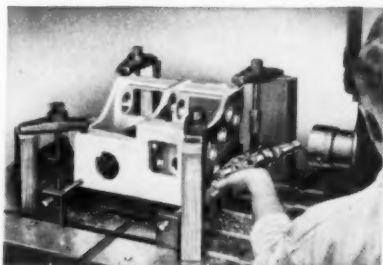
**change tools in seconds!
retain exact diameter settings . . .**



WITH MICROBORE FLASH-CHANGE SYSTEM!

Flash-Change permits a boring bar, set to a specific bore diameter, to be changed in seconds for other machining operations. Again and again, the bar can be quickly repositioned in the machine to accurately duplicate the original operation without further adjustment.

Flash-Change tooling includes a complete range of boring, drilling and milling equipment readily adaptable to any machine, or from one machine to another, by means of a simple Flash-Change Tool Holder with driving shank to suit the machine spindle. In addition to Flash-Change, the Microbore System includes a complete range of Standard Boring Bars. Special Cluster Bars can be furnished upon receipt of a part print and engineering data.



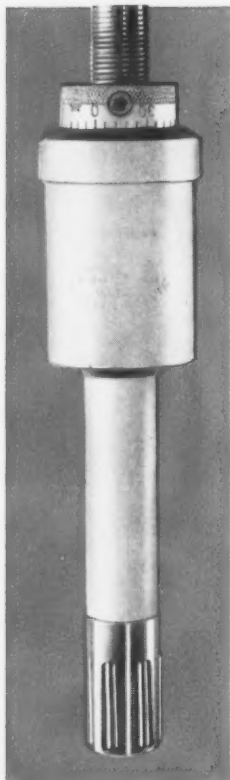
Shown is a cast iron gear box machined with Flash-Change tooling on a production basis. Production time substantially reduced. Bore diameters duplicated to extremely fine limits.

● For complete information on a tool system that can greatly increase your production standards and profits, write for Catalog No. 58.

DeVLIEG MICROBORE SYSTEM

DEV LIEG MICROBORE • DIVISION OF DEVLIEG MACHINE COMPANY

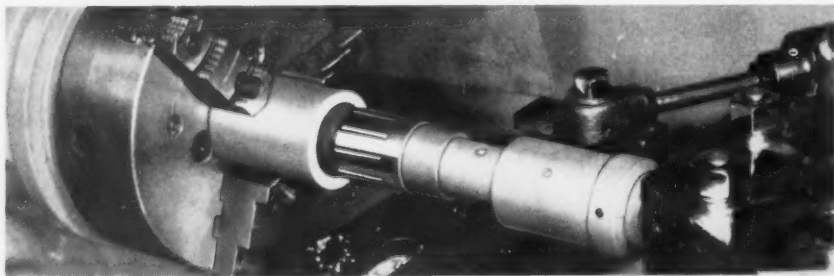
Fair Street, Royal Oak, Michigan
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WITH THE MADISON *microller*[®] BURNISHING TOOL, YOU GET A FINE FINISH - FAST!

- This revolutionary tool finishes rough bored or turned surfaces, of 125 mu. and higher, to 5 mu. and lower at feed rates of 8 to 12 inches per minute.
- The Microller gives you, in one pass, a finish far superior to any that can be produced with abrasive processes.
- You run thousands of parts without tool wear.
- No operating skill required.
- Can be used in any standard shop equipment.
- Finishes any machineable metal — creates a condensed, compacted surface.

For additional information, call your Madison representative, or write for our latest bulletin.



MADISON Industries, Inc.

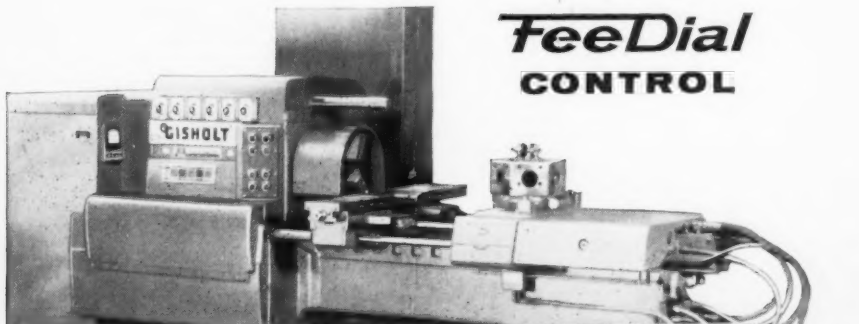
P. O. BOX 1137, PROVIDENCE, RHODE ISLAND

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ANNOUNCING

NEW GISHOLT 3F FASTERMATIC WITH

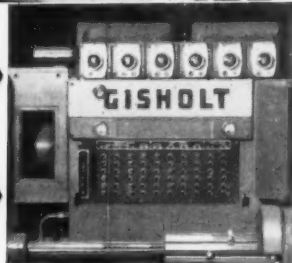
*Fee*Dial CONTROL



DIAL YOUR
FEEDS



FLICK YOUR SPEED
& FUNCTION SWITCHES



IN JUST 15 MINUTES!

...then set your tools and take your trial cuts. That's how fast and simple it is to set up the new Gisholt MASTERLINE 3F FASTERMATIC Automatic Chucking Turret Lathe!

Only 15 minutes to pre-select feeds, speeds and functions—Now the desired feed rate is individually selected for each tooling station by turning a dial control. Selection of spindle speeds and machine functions is equally fast—just flick toggle switches. You do it all in just 15 minutes.

Completely automatic—But your savings don't end with fast setup. The automatic cycle assures consistent quality at fixed production rates. Any operator, even a new man, can chuck the work, start the cycle and remove the finished part. He has ample time to handle another machine.

What's more fast setup makes the new 3F pay off big on machining small lots—25 to 50 pieces—as well as long production runs. Contact your Gisholt Representative, or write us.

Send for literature—Ask your Gisholt Representative to show you how this new 3F with FeeDial can cut costs on your work.



GISHOLT

MACHINE COMPANY

Madison 10, Wisconsin

- Turret Lathes • Automatic Lathes
- Balancers • Superfinishers • Threading Lathes
- Factory-Rebuilt Machines with New-Machine Guarantee

Investigate Gisholt's Extended
Payment and Leasing Plans

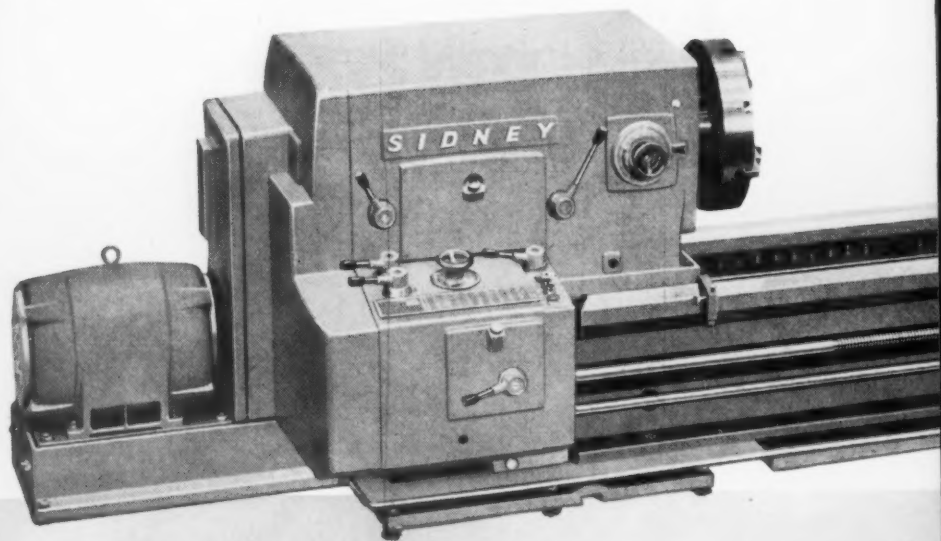
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August, 1960

MODERN MACHINE SHOP

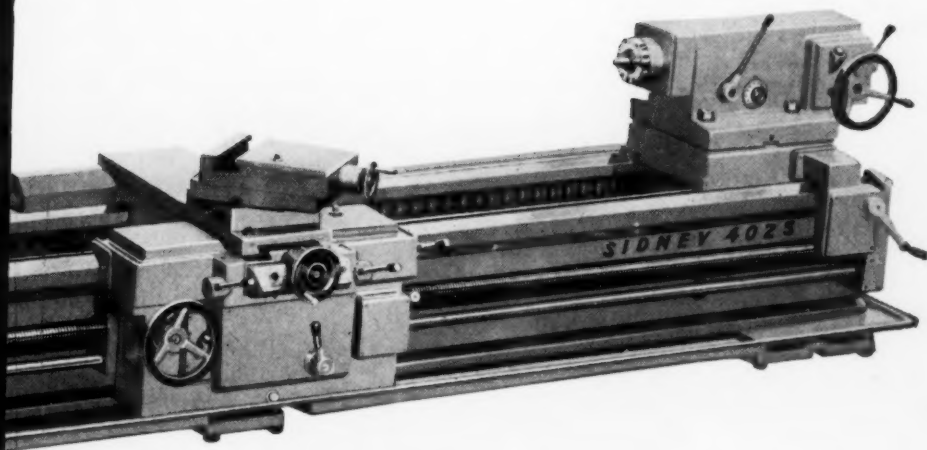
15

A GREAT OLD NAME



 *all-new*
SIDNEY
4025

GETS NEW GLORY



AN all-new LATHE FROM THE FLOOR UP

Now! From one of the most respected names in the machine tool industry comes a completely new lathe, the Sidney 4025. The extra heavy-duty 4025 is a product of Sidney's years of experience plus extensive research among lathe

users to determine the features most wanted in a lathe. The result is an all-new lathe which removes metal faster, easier and at lower cost on a wide range of jobs. Here are just a few outstanding features of the new Sidney 4025:

75 HORSEPOWER in all speed ranges makes possible a metal removal rate of up to 180 cubic inches per minute. This extra power gets the job done faster and at lower cost.

DUAL CAM TUMBLER LOCK for gearbox eliminates the possibility of gear and cone gear unlocking during exceptionally heavy feeds. Gearbox also provides 60 threads and feeds for greater versatility.

PLUS . . . Anti-friction bearings throughout, automatic lubrication, and many other exceptional features. For complete information, contact your local Sidney Distributor or write directly to:

SPEED RANGE OF 5 TO 800 R.P.M. permits the selection of a surface speed to handle a larger variety of work or materials. The Sidney 4025 can achieve a 22 to 26 micro inch surface finish.

THREE DIMENSIONAL TRUSS DESIGN of bed gives exceptional rigidity to handle the torsional load of the full 75 horsepower. The one piece bed also features replaceable hardened and ground tool steel ways.

SIMPLIFIED CONTROLS located at a convenient height for the operator provide faster, easier operation. Spindle controls consist of a single dial and shifting lever for r.p.m. or surface speeds.

DEPTH READING DIAL measures tailstock spindle travel to eliminate possibility of operator error. Operator-selected live or dead spindle is optional for maximum control and versatility.

THE SIDNEY MACHINE TOOL COMPANY • SIDNEY, OHIO / A WHOLLY OWNED SUBSIDIARY OF BUHR MACHINE TOOL CO.

SEE THE SIDNEY LATHES in action at the National Machine Tool Exposition, September 6 thru 16, Chicago Booth 1440.

For more data circle 324 on Postpaid Card

HARDINGE
ELMIRA, N.Y.

High Speed Precision MILLING MACHINES

The RIGHT Size For Work

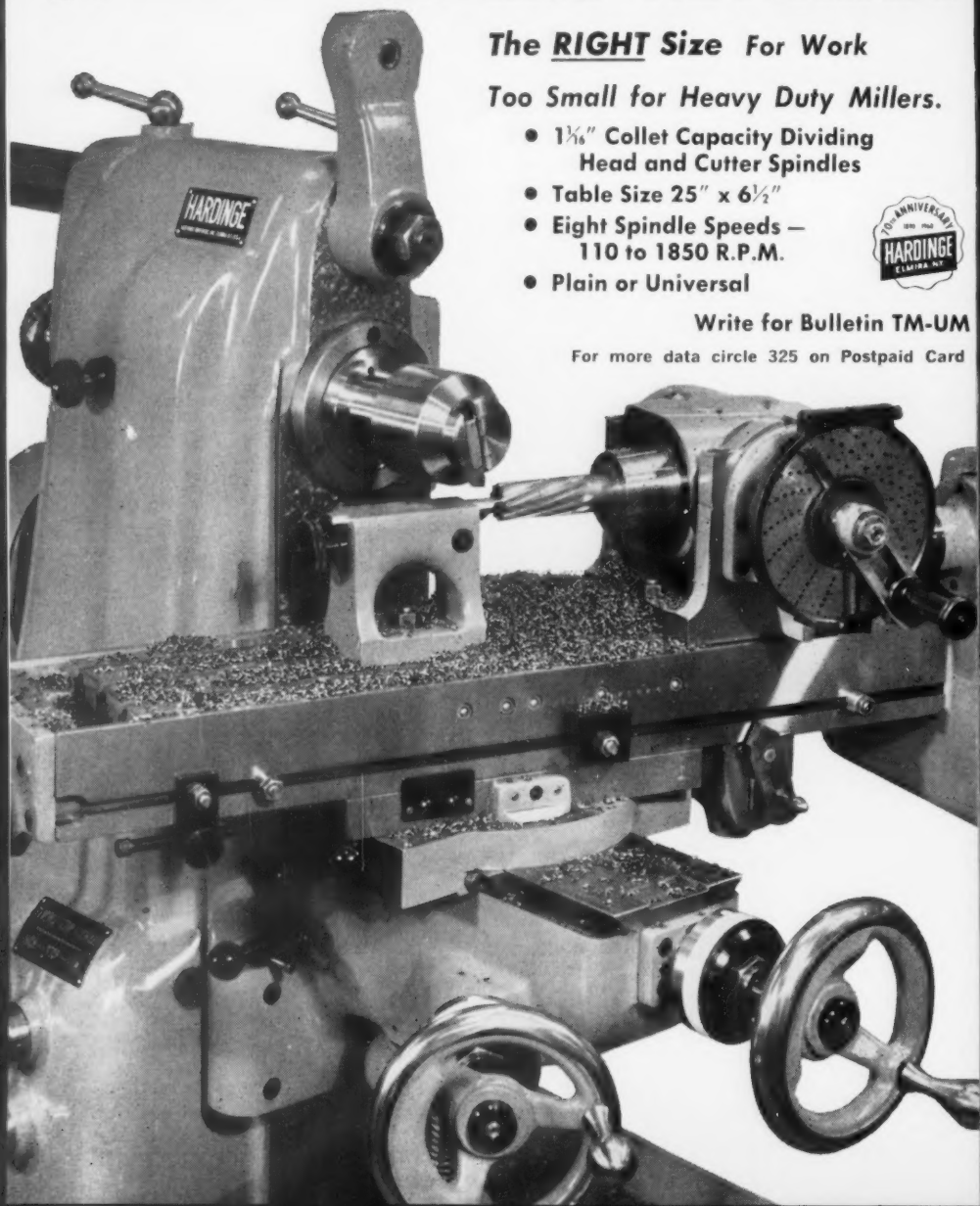
Too Small for Heavy Duty Millers.

- 1 3/8" Collet Capacity Dividing Head and Cutter Spindles
- Table Size 25" x 6 1/2"
- Eight Spindle Speeds — 110 to 1850 R.P.M.
- Plain or Universal



Write for Bulletin TM-UM

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HARDINGE BROTHERS, INC., ELMIRA, N. Y.

5 Basic Reasons why MARVEL HACK SAWS CUT-OFF MORE ACCURATELY...

The consistently accurate performance of MARVEL Heavy Duty Hack Saws is no accident. MARVEL engineers knew, many years ago, that to produce and maintain accurate cutting-off, a hack saw must be designed and built like a fine machine tool.

Some of the basic design principles built into the modern MARVEL Hack Sawing System that makes it the most accurate cutting-off method you can use are:

1. V-Way Design...Greater Rigidity

Upright and Saddle are precision machined and fitted to form a rigid, integral unit capable of withstanding any cutting load with no deflection or side movement.

2. Anti-Friction Bearing Construction

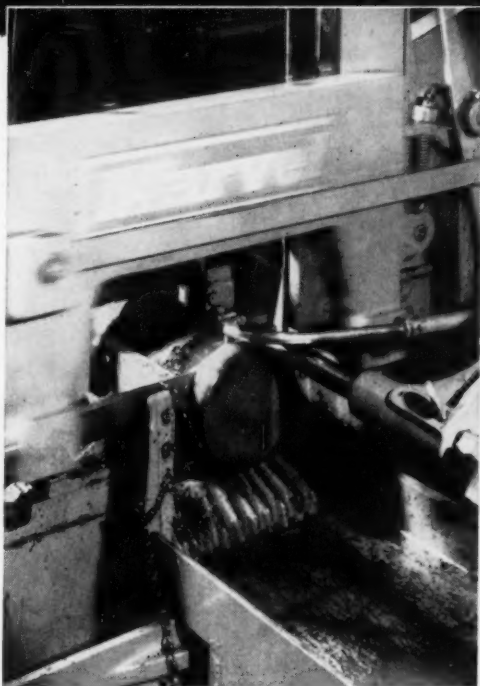
Anti-friction ball or roller bearings are used at all load carrying points. Even the strongly braced saw frame reciprocates on heavy duty, fully enclosed preloaded ball bearings which provide permanent, frictionless rigidity and true-running, straight line cutting strokes.

3. Minimum Blade Frame Reach

Close-coupled design and crank lever action of MARVEL Saws keeps the saw frame and blade reach very short in relation to the vertical V-ways on which the unit is mounted. This insures optimum rigidity, even under the most severe operating conditions.

4. Positive Relief Blade Lift

On the return stroke, positive relief lift raises the blade to provide proper and "cushioned" lead-in on the next cutting stroke. This prolongs blade sharpness, life and accuracy.



5. Rigid Cutting Tool

Cutting-off accuracy requires a rigidly held, relatively short cutting tool. MARVEL Unbreakable High-Speed-Edge Hack Saw Blades, which combine a narrow high speed steel cutting edge permanently welded to a tough alloy steel body, can be tensioned from 200% to 300% more taut than ordinary blades. This provides a most rigid cutting edge.

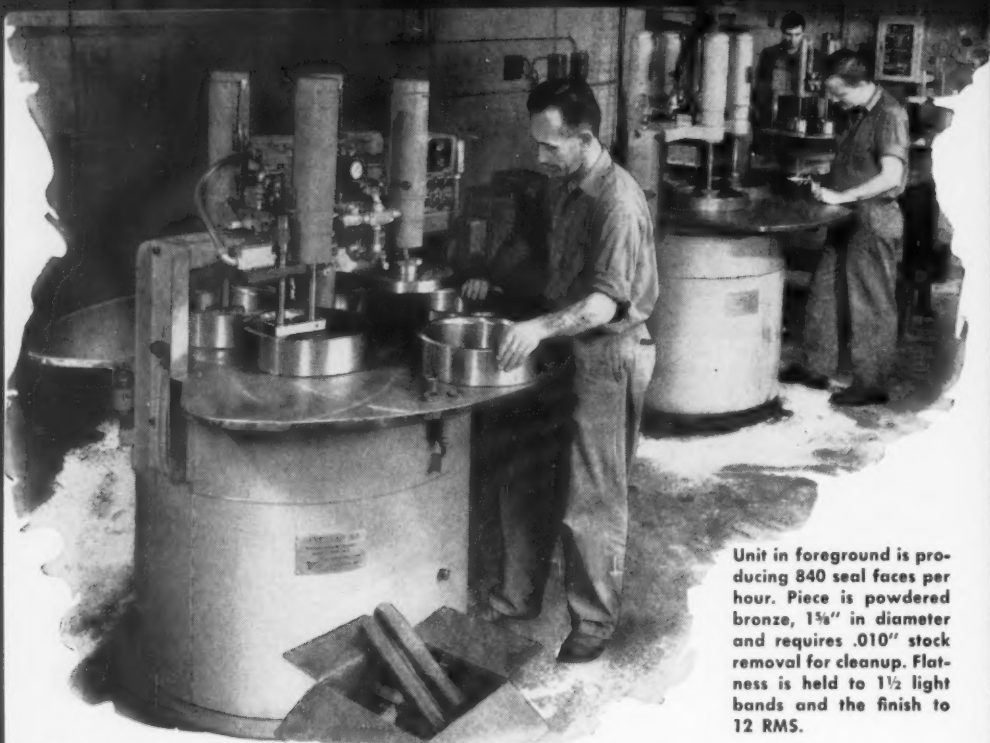
See Us in Space 1340
Machine Tool Exposition

PS-1205



ARMSTRONG-BLUM MFG. CO.
5700 W. BLOOMINGDALE AVE., CHICAGO 39, ILL.

For more data circle 326 on Postpaid Card



Unit in foreground is producing 840 seal faces per hour. Piece is powdered bronze, 1 1/2" in diameter and requires .010" stock removal for cleanup. Flatness is held to 1 1/2 light bands and the finish to 12 RMS.

SPEEDLAP with

ONE OPERATOR PRODUCING 840 SEAL FACES PER HOUR

If your production calls for rapid stock removal with high accuracy in size, flatness, parallelism and finish, be sure to check on Speedlap's performance.

These units grind and lap at the same time with micro-inch accuracy. Give you finishes of 1 RMS; flatness and parallelism to 2 millionths of an inch—with tungsten carbides, ceramics, tough alloys or plastics. Best of all they give you **LAPPING ACCURACY AT GRINDING PRICES.**

Ask for cost and production estimates based on samples of your work. No obligation. Job lapping service also available.

5 Exclusive FEATURES

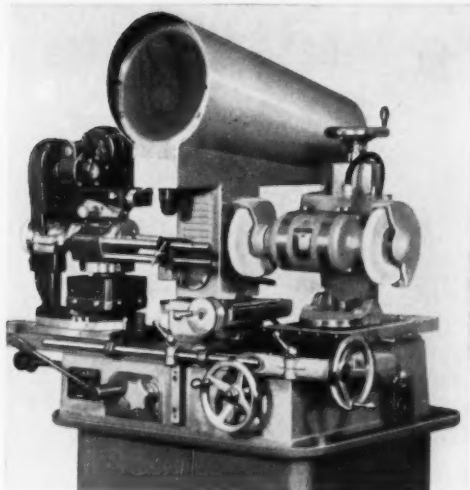
enable a Speedlap to finish jobs better and faster:

- ✔ Water cooled lap base dissipates operational heat to avoid distortion.
- ✔ Non-chargeable alloy lap plate assures rapid stock removal.
- ✔ Full wear control maintains constant lap flatness.
- ✔ Adjustable parts handling stage loads and unloads parts quickly.
- ✔ Full pressure air system maintains maximum lapping pressure and automatically raises pressure plates at end of lapping cycle.



SPEEDLAP CORPORATION / 8022 North Monticello Avenue Skokie, Illinois

This is R-O with the new R-O swing-in comparator. Now all the advantages of R-O form relief cutter sharpening are yours, even easier, faster and more accurate than ever!



DON'T TAKE CUTTING TOOL PERFORMANCE FOR GRANTED

next month!

At the MTBA show in Chicago, next month, you'll observe the latest and finest in metal working machine tools — but remember this; speeds, feeds and quality can not exceed cutting tool ability. Regardless of a machine's efficiency it comes to a halt when the cutting edge is gone! R-O gives you a longer lasting, better performing edge.

RO
UNIVERSAL
FORM RELIEVING
FIXTURE

R-O Grinder

R-O MANUFACTURING COMPANY

31171 Stephenson Highway, Madison Heights, Mich.

Please forward the R-O catalog.

Firm _____

Address _____

City _____ Zone _____ State _____

Per _____

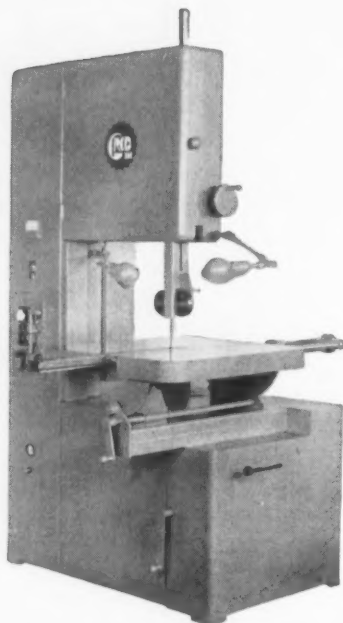
Title _____

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GROB SPELLS THE DIFFERENCE IN BAND SAW MACHINES

The new GROB 24" universal band saw
has all the famous GROB features:

Quality • Efficiency • Durability • Strength
Utility • Low Maintenance • Reasonable Cost



- Speeds infinite from 35 - 12000 FPM covers both cold and hot sawing

- Variable drive 3-speed transmission with precision rolled gears and splines transmits 15 HP

- Hydraulic table feed

See the difference demonstrated in our dealers' showrooms

or

Write GROB INC. for complete specifications

GROB also manufactures a complete line of:



**BUTT WELDERS
FILING MACHINES
GEAR ROLLING MACHINES**

GRAFTON, WISCONSIN

For more data circle 329 on Postpaid Card

here's why GTS marking tools offer ...TRUE LONG-RUN ECONOMY



Engraving Zone precision—performance proved steel—wide experience, ASSURES LONG TOOL LIFE

In the critical Engraving Zone, the faces and bevels of engraved characters must be cut with precision on selected tool steel . . . for tool performance stamina and sharp impressions.

Since GTS Marking Tools are precision cut from the proper steel, your markings are *clear, always uniform and easy-to-read*. GTS Marking Tools have proved their performance stamina. Years of wide experience, careful inspection and traditional craftsmanship assures you *long tool life* . . . and this means *true long-run economy*.

All GTS marking tools are of the *same high quality*, whether standard or special. *Fast, dependable delivery*, everywhere.

Our Marking Engineers can help you specify the right tools for maximum economy and efficiency. **WRITE, WE'LL SEND COMPLETE CATALOG.** If you prefer, call EAstgate 7-0300.

GEO. T. SCHMIDT, INC.

1806 W. BELLE PLAINE, CHICAGO 13, ILL.



IF IT'S WORTH MAKING, IT'S WORTH MARKING

For more data circle 330 on Postpaid Card

Take the

Confusion

Out of Tool Steel

With the A-L Steelector System

How can you pick the right tool steel when there are more than 1000 brands, each jostling for your attention? And how can you pick a tool steel and know before you order that the grade you want is available—without delays—in the size and shape you need?

If you are tired of wrestling with these problems you will like the new Allegheny Ludlum Tool Steel STEELECTOR Program. With it you can accurately select a tool steel that will meet your requirements and be sure that you have picked a grade that is in stock . . . as near as your warehouse source.

It's easy to make accurate selections with the STEELECTOR Program. The three STEELECTOR cards—covering general purpose tool steel applications, hot work applications, and high speed grades—show at a glance the comparative properties of tool steel grades that will suit 96% of all tool steel applications listed in the A-L Tool Steel Handbook.

The STEELECTOR cards use bar graphs to make it easy to make precise comparisons of abrasion resistance, toughness, size stability, machinability, and red hardness. All you have to do is pick the grade

with the particular combination of properties you need for the job at hand.

For each grade, there is a Data Stock List that tells you the exact analysis of the grade, its basic properties, typical applications and their working hardnesses, and temperatures for hardening, tempering, and annealing. And the complete range of available sizes and shapes is listed.

You can count on getting quality tool steel by using the STEELECTOR Program. Each STEELECTOR grade has been selected from the complete line of Allegheny Ludlum Tool Steel and made under the exacting quality control standards of all A-L products.

The new A-L Tool Steel STEELECTOR booklet contains the STEELECTOR Cards, descriptions of the various grades, and explains the individual Data Stock Lists available for every grade. For your own copy ask your Allegheny Ludlum sales representative, or write: *Allegheny Ludlum Steel Corporation, Oliver Building, Pittsburgh 22, Pennsylvania. Address Dept. MS-8.*

STEELECTOR
PROGRAM



ALLEGHENY LUDLUM

Tool Steel warehouse stocks throughout the country



For more data circle 331 on Postpaid Card

2084A

Allison-Campbell

ABRASIVE CUTTING KNOW-HOW

ACCO

for Better
Values



With this Campbell Machine, you can -- Cut 6-inch Diameter Hard Alloys in Less than 3 Minutes!

• This Campbell wet abrasive cutting machine—the Model 406—will cut tubing, bar stock, angle iron, or any other shape up to 6" round or square—and it will cut practically any material, including the new super alloys and exotic metals.

High speed • 4 to 8 seconds per square inch is normal wet abrasive cutting speed. Cut 6" diameter hardened steel in less than 3 minutes. **Accuracy** • Model 406 will cut 3" diameter material to lengths within $\pm .010"$, 6" diameter within $\pm .030"$. **Fine finish** • No burn, minimum burr. **Power oscillation** • Cutting wheel moves back and forth across cut as wheel is fed downward. Result—greater cutting capacity, longer wheel life.

Proper coolant application • Large reservoir, 33 gallon/min. pump, give high coolant volume. Unique Campbell distributor applies coolant equally to both sides of wheel—a requirement for accurate cuts.

OTHER CAMPBELL MACHINES FOR ANY CUT-OFF NEED • Choose from four types of Campbell machines for wet or dry cutting—chop stroke, oscillating, horizontal or rotary—with capacities up to 14" rounds, 12" billets, plate up to 6" thick and 20 ft. long.

Write for Bulletin DH-260 for details on the Model 406, or describe your cut-off application and we'll send you information on the proper Campbell machine.



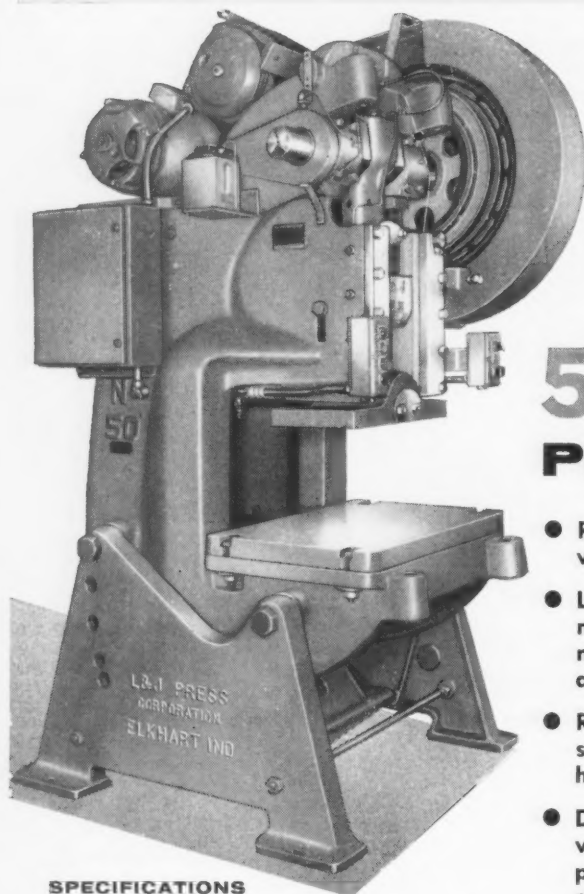
CAMPBELL ABRASIVE CUTTING MACHINES

Allison-Campbell Division • American Chain & Cable Company, Inc.

931 Connecticut Avenue, Bridgeport 2, Conn.

For more data circle 332 on Postpaid Card

KEEP GOOD DIES GOOD



with
L&J

50 SERIES PRESSES

- Readily adaptable to wide variety of work.
- Large box-type slide, mounted in long gibs, maintains accurate alignment.
- Rigid frame design resists deflection under heavy work loads.
- Dies mate perfectly — wear is minimized. Close product tolerances stay close.
- Proven L&J features insure long dependable service, cut maintenance.

SPECIFICATIONS

Two capacities—50 or 60 tons, geared and non-geared models. Slide face 24" x 12". Bolster 36" x 24". Opening through back 22". Shut height 11'*, Slide stroke 4'*. Slide adjustment 3".

*or to suit

Write for catalog.

For more data circle 333 on Postpaid Card

L&J PRESS CORPORATION

1624 STERLING AVE., ELKHART, IND

The broached opening on an Apex Fast-Lead Socket is designed to lead the

THIS IS AN APEX IMPACT SOCKET

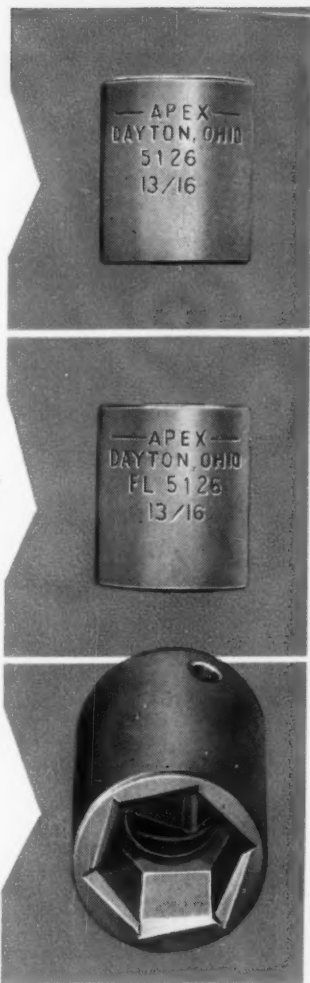
socket on to the nut or bolt, engaging completely the instant contact is made. When you use Apex Fast-Lead Sockets on power tool production operations, you can run down an entire series of nuts or bolts without ever stopping the tool. Because an Apex Fast-Lead Socket "gets

THIS IS AN APEX FAST-LEAD SOCKET

on" in one-sixth of a turn, with a single, uninterrupted motion, it isn't necessary to even hesitate just before the socket makes contact. And that goes for multiple power tool units, too.

THIS IS WHAT A FAST-LEAD SOCKET DOES FOR POWER TOOL USERS!

Apex Fast-Lead Sockets . . . $\frac{1}{4}$ " through $\frac{5}{8}$ " square drive . . . $\frac{3}{8}$ " through $1\frac{1}{8}$ " broached hex openings . . . short, standard, long and extra long lengths. Catalog 30-A has all the facts—write, on your company letterhead please, for your copy.



APEX FASTENING TOOLS

SCREWDRIVING • NUT RUNNING • SPECIAL

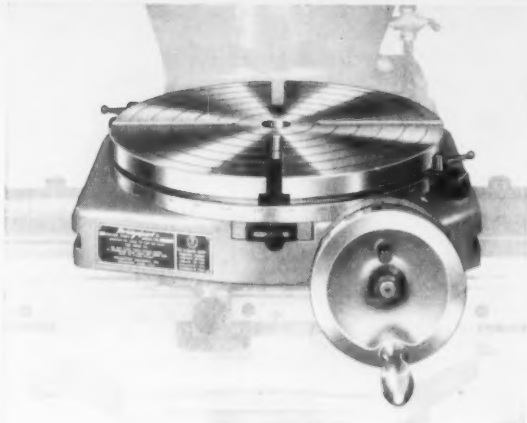
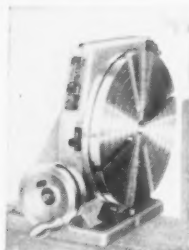
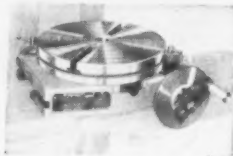
The APEX Machine & Tool Co. • 1027 So. Patterson Blvd. • Dayton 2, Ohio

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Bridgeport

Precision
**ROTARY
MILLING
TABLES**

MODELS 12", 15" DIAMETER



Outstanding Features

assure

**"The Most
for the
Least"**

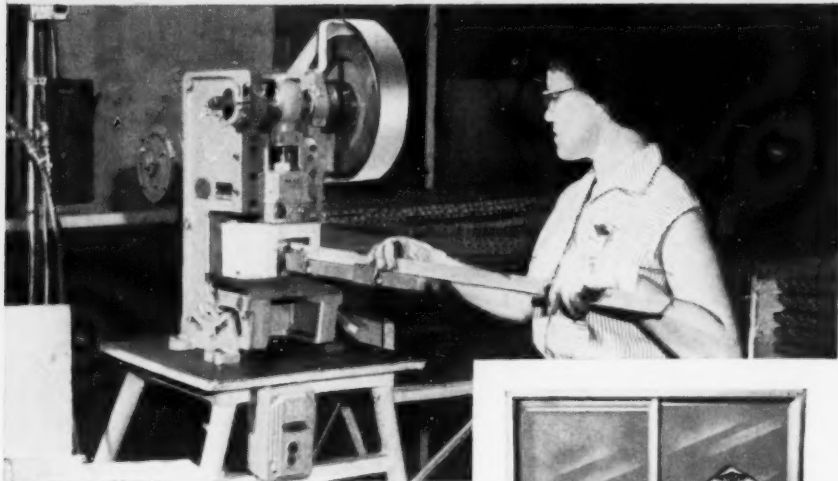
- WORM and SHAFT** One piece — Hardened and Ground — Alloy Steel.
- GEAR** Normalized cast iron fastened to table and machined to extremely close tolerances.
Worm can be disengaged to facilitate set up.
Adjustment has been provided for the following: worm end play, table radial play, table thrust, backlash of worm.
- GRADUATIONS** Table graduated every degree, dial every minute, adjustable zero mark, adjustable dial.
- BEARING** Anti-friction, adjustable roller bearing for radial play, adjusting thrust washer for end play.
- LUBRICATION** Worm and gear immersed in heavy oil, oil cups for center bearing, table base surface, etc. Unit completely sealed against foreign matter.
- LOCKING** Two non-influencing locks are provided.
- ACCESSORIES** Tail stocks, centers 90° angle plate, hold downs and handle clamps, indexing attachment and index plates.

Consult us or your nearest dealer for further details

***Bridgeport* MACHINES, INC.**
Bridgeport, Connecticut
Manufacturers of High Speed Milling Attachments and Turret Milling Machines

For more data circle 335 on Postpaid Card

KENDALL-ADDINGTON STANDARDIZE ON KENCO PRESSES..... die life increased 10 times



THIS 5 TON PRESS IS ONE OF 21 KENCO PRESSES THAT PIERCE, NOTCH AND SHEAR ALUMINUM WINDOW COMPONENTS TO THE PRECISION NEEDED FOR PROPER ASSEMBLY.

Kendall-Addington of Fresno, California, leading manufacturer of unitized aluminum windows, have standardized on Kenco by adding 21 of these cost-cutting Presses in their punch press department. Comparative tests since 1958 have shown that Kenco Presses increase die life up to 10 times and also eliminate former mechanical difficulties requiring major press maintenance. Complete replacement of other presses with Kenco equipment is paying off at Kendall-Addington through substantial reduction in production costs.

Why not get all the facts about the advantages of Kenco construction?—greater rigidity, precision and reliability that save your dies and make press time more productive. A Kenco representative will be glad to discuss your requirements at no obligation.



(Write for Kenco literature) giving complete press specifications.



also 18, 21 and 26 tons capacities

THE MOST COMPLETE LINE OF SMALL PUNCH PRESSES IN THE WORLD

KENCO
MANUFACTURING COMPANY
9711 Telegraph Road, Los Angeles 22, Calif.

F.O.B. Shipments Chicago or Los Angeles

For more data circle 336 on Postpaid Card

PRODUCTION INCREASED UP TO 98%

Burgmaster Tape Controlled

\$3260 SAVINGS



\$165 COST

TOOL SAVINGS
ALONE
PAY FOR MACHINE
IN LESS THAN
1 YEAR

A production analysis of six typical jobs produced by Mechanical Specialties Co., Los Angeles, California on their Burgmaster Tape Controlled 6-Spindle Turret Drill shows that production costs have been sharply reduced on diversified job shop work. By comparing the operation of the Burgmaster Machine with conventional drilling methods it was found that average production was increased 98% while a tool savings of \$3260 for the six jobs was realized. Lot sizes ranged from 1 to 50 parts.

During the recent 12 month period, over 100 diversified jobs requiring a high degree of precision have been produced on the Burgmaster at this plant. The savings in tooling costs alone in this length of time far exceed the cost of the Tape

Controlled Burgmaster.

For more data circle
337 on Postpaid Card

THE IDEAL MACHINE FOR THE JOB SHOP

— MAXIMUM FLEXIBLE AUTOMATION

Mechanical Specialties says, "Lots of any size are produced more economically on our Tape Controlled Burgmaster Machine — small lots are no problem." This is because tooling costs — and lead time — are greatly reduced. Jigs and complex fixtures are not required. Instead, simple work holding devices and standard clamps are ordinarily used.

Parts are produced faster and to greater precision because all machine functions are controlled by tape, eliminating the human factor. The positioning table locates the work under the turret within $\pm .001$ " for each operation. During each turret index, the spindle in the working position automatically shifts to the preselected standard machine settings of speed, feed and depth of cut.

THE MACHINE TOOL



Booth 840

Exposition - 1960

\$3260 TOOL SAVINGS
IN DIVERSIFIED JOB SHOP WORK WITH A

Six-Spindle Turret Drill

(at mechanical specialties co., los angeles)



14 holes include c-drill, drill, c'bore, chamfer and tap. Savings: tooling 7 hrs./75 hrs., machine time: .4 hrs./1.8 hrs.



28 holes in 2 setups include c'drill, drill, c'bore, chamfer and tap. Savings: tooling 3 hrs./115 hrs. machine time 1.2 hrs./3.6 hrs.



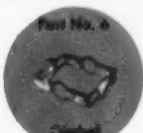
10 holes in two setups include c'drill, spotface, drill and tap. Savings: tooling 5 hrs./90 hrs.



9 holes include c'drill, spotface, drill, tap and bore. Savings: tooling 4 hrs./30 hrs., machine time .7 hrs./1.1 hrs.



50 holes include c'drill, drill, c'bore, chamfer, and bore. Savings: tooling 8 hrs./215 hrs., machine time 1.7 hrs./2.8 hrs.



140 holes in 6 setups include c'drill, drill and tap. Savings: tooling 6 hrs./120 hrs., machine time 2.3 hrs./4.5 hrs.

SIX TYPICAL JOBS

SHOW SAVINGS

ON TAPE CONTROLLED
BURGMASER COMPARED TO
CONVENTIONAL
DRILLING METHODS.

PRODUCTION DATA CHART

		BURGMASER TAPE CONTROL				CONVENTIONAL DRILLING						
Part No.	Part Name	Program and Punch Tape Hrs.	TOOLS		Mach. Time Hrs.	TOOLS		Mach. Time Hrs.	No. of Setups	No. of Holes	Operation	
			Hrs.	\$		Hrs.	\$					
1	Valve Body	.5	7	35.00	.4	75	375.00	1.8	1	14	Cr Dr Dr Ch C'br Tap	
2	Hyd Cont. Valve Inlet	3.1	3	15.00	1.2	115	575.00	3.6	2	28	Cr Dr Dr Ch C'br Tap	
3	Missile Component Ring	.8	5	25.00	1.4	90	450.00	1.4	2	10	Cr Dr SF Dr Tap	
4	Ring for Missile	.6	4	20.00	.7	30	150.00	1.1	1	9	Cr Dr SF Dr Tap Bore	
5	Computer Rail	.7	8	40.00	1.7	215	1075.00	2.8	1	50	Cr Dr Dr CB-CH Bore	
6	Gimbal	4.1	6	30.00	2.3	120	600.00	4.5	6	140	Cr Dr Dr Tap	



Write for Bulletin describing Burgmaster 6 and 8 Spindle Tape Controlled Turret Drilling, Tapping and Boring Machines. Forty-minute 16mm sound film showing all Burgmaster Turret Drills in operation is available without charge.

BURG TOOL

MANUFACTURING COMPANY, INC.

15001 South Figueroa St., Gardena, Calif.
FACULTY 1-3510 • DAVIS 9-4158

BURGMASER DIRECT SALES OFFICES: Ridgewood, N.J., 86 North Maple Ave., Gilbert 4-3002 • Chicago 5, Ill., 4908 Lincoln Ave., Long Beach 1-1178 • Cleveland 7, Ohio, 14706 Detroit Ave., Academy 6-7030 • Detroit 37, Mich., 13730 W. Eight Mile Rd., Lincoln 8-4333 • Northern California, Jefferson 7-1650

Plus dealer representatives in other industrial centers.

World's Largest
Builder of Turret
Drilling Machines



"0" Manual Power
Index 1/4" Capacity



1C Manual Power
Index 1/2" Capacity



2B Manual Power
Index 3/4" Capacity



2BR Ram Type Radial
Drill 1/2" Capacity



2BH Automatic Hydraulic
1/2" Capacity



3BH Automatic Hydraulic
1 1/2" Capacity



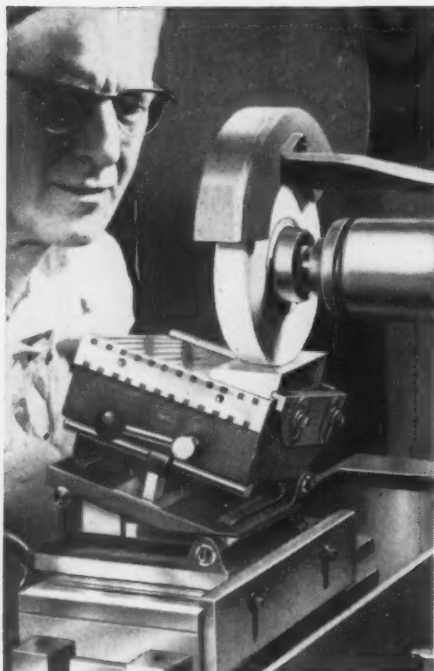
25AH Automatic Tape
Controlled 1 1/2" Capacity



26H 3BH Automatic
Tape Controlled
1/2" and 1 1/2" Capacity



NOW—SINE PLATES FROM EX-CELL-O!



EX-CELL-O ADDS ROBBINS MAGNA-SINE TO LINE OF PRECISION GAGE AND INSPECTION EQUIPMENT

Magna-Sine and non-magnetic sine plates, formerly manufactured by the Omer E. Robbins Company, are now part of the famous Ex-Cell-O line of precision inspection, gaging, and machining equipment. With Ex-Cell-O Magna-Sine you set up any angle, single or compound, right or left hand, without V-blocks, angle plates, or complicated "build-ups". Just select the proper gage blocks, place them between the base and roll bar swivel block, flip the locking device . . . and you're ready to go! And Ex-Cell-O Magna-Sine holds work securely—without clamps—by the most powerful holding force ever built into a permanent chuck magnet.

Ex-Cell-O sine plates are available in a complete range of sizes and models, magnetic and non-magnetic, for every machining and inspection operation.

New Ex-Cell-O 90° Indicator Gage

For faster, easier, precision checking of squareness, use the new Ex-Cell-O 90° Indicator Gage—plus or minus accuracy to .0001" is instantly registered on its dial gage. Surfaces up to 17 3/4" long can be checked with each reading. Also, when used with Ex-Cell-O precision sine plates, this time-saving indicator gage will quickly measure the accuracy of angles other than 90°.

The Machine Tool Exposition—1960



See Ex-Cell-O
In Booth 946

J-8862

EX-CELL-O
CORPORATION
DETROIT 32, MICHIGAN



EX-CELL-O FOR PRECISION

MANUFACTURERS OF PRECISION MACHINE TOOLS • GRINDING AND BORING SPINDLES
• CUTTING TOOLS • RAILROAD PINS AND BUSHINGS • DRILL JIG BUSHINGS •
TORQUE ACTUATORS • CONTOUR PROJECTORS • GAGES AND GAGING EQUIPMENT
• GRANITE SURFACE PLATES • AIRCRAFT AND MISCELLANEOUS PRODUCTION PARTS
• ATOMIC ENERGY EQUIPMENT • DAIRY AND OTHER PACKAGING EQUIPMENT

For more data circle 338 on Postpaid Card

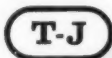


T-J CUTTERS

**Designed To Do *More Jobs* ... Produce *More Work*
... Save *More Production Time and Cost***

Proved, definitely, as the cutting tool for the die-sinking industry, T-J now offers an expanded cutter line for the precision milling of today's high speed, high production manufacturing. The new line has been designed to do more, as well as add to individual cutter life. Cutters feature a high helix angle, double back-off, right or left hand spiral, and flats on the shanks for set screw type chucks. Write today for Catalog No. 259 and complete details to The Tomkins-Johnson Co., 2425 W. Michigan Ave., Jackson, Mich.

Representation in all major areas, including Canada.



TOMKINS - JOHNSON

RIVETORS...AIR AND HYDRAULIC CYLINDERS...CUTTERS...CLINCHORS

For more data circle 339 on Postpaid Card

SEE THE BIG ADVANCES



WIEDEMATIC TURRET PUNCH PRESS

with Numerical Positioning Control



60 HOLES A MINUTE

with Automatic Work Positioning and Tool Selection

SEE the Wiedematic position and punch holes of many sizes and shapes automatically in actual production runs of sheet metal and plate parts.

SEE how all press operations are controlled with amazing speed and accuracy by an easily prepared punched tape.

SEE how the Wiedematic Method reduces production costs 60% to 90% and provides the key to major savings in every other phase of your operations from design to final assembly.

Be sure to see the Wiedematic in operation
— Booth 1249 at the Machine Tool Exposition.

WIEDEMANN

WIEDEMANN MACHINE COMPANY
DEPT. MM-8 • GULPH ROAD • KING OF PRUSSIA, PA.

International Amphitheatre
Chicago, Ill. • September 6-16

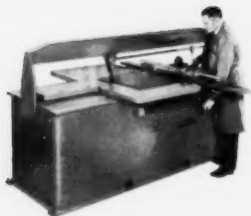
REGISTER HERE,



IN FLEXIBLE FABRICATION

WIEDEMANN TEMPLAMATION

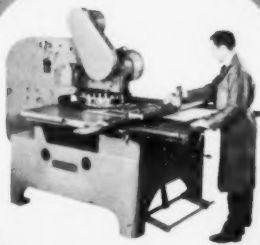
Making Full Use of Low Cost Templates
For Fast, Accurate Piercing



1. TEMPLATE IS MADE
ON THE WIEDEMANN COORDINATOR



2. TEMPLATE IS INSPECTED
ON THE WIEDEMANN INSPECTOR



3. TEMPLATE IS USED FOR HIGH SPEED
HOLE POSITIONING ON THE
WIEDEMANN RA-41P
TURRET PUNCH PRESS

Other Wiedemann Turret Punch Presses will also be in operation.

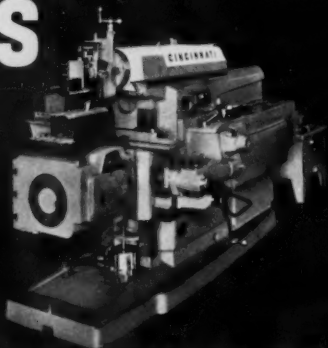
THEN HEAD FOR THE FAR CORNER—BOOTH 1249 **WIEDEMANN**

For more data circle 340 on Postpaid Card

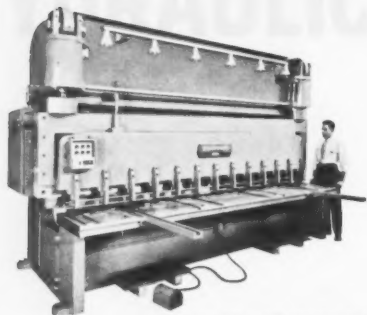
RIGID SHAPERS



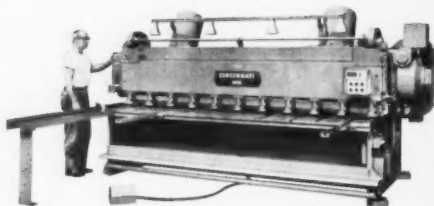
Fast and accurate metal removal will be exhibited by the Cincinnati 24" Rigid Shaper—see it cut 2" deep at .030" feed.



This 16" Cincinnati Duplicating Shaper demonstrates automatic tracing from a simple sheet metal template.

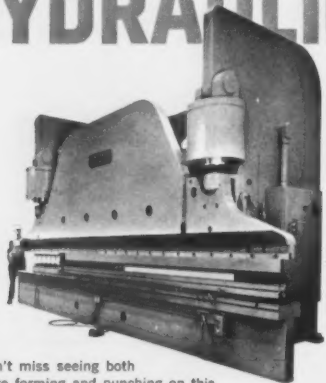


This new $\frac{3}{4}$ " x 12' Cincinnati Hydraulic Shear, with adjustable rake from 0° to $\frac{3}{4}$ " per foot, will cut from relatively thin sheets up to $\frac{3}{4}$ " mild steel plate.

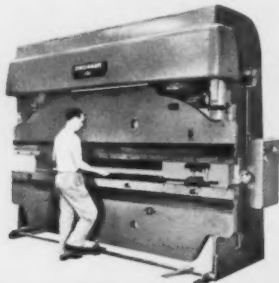


Check the fast, accurate sheet shearing performance of this Series 1410 Cincinnati Shear ($\frac{1}{4}$ " x 10' mild steel capacity) equipped with a magnetic sheet support.

HYDRAULIC AND MECHA



Don't miss seeing both plate forming and punching on this Cincinnati Series 750-H x 16' Hydraulic Press Brake. Fast set-up, long stroke and deep throat make it especially profitable for fabricators who produce varied shapes in plate.



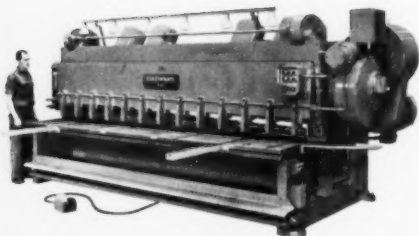
The 3 Series x 10' Cincinnati Press Brake, 75 tons near bottom of stroke, has all the Cincinnati refinements: all-steel construction, centerline loading, rigid, micro-crowned bed and ram, motorized ram adjustment plus many other features.

All in action at

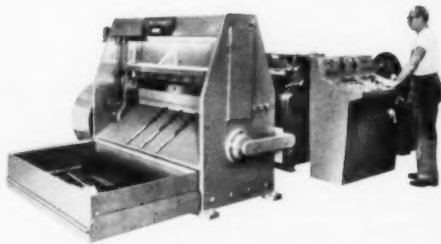
THE CINCINNATI BOOTH 1230 SHAPER CO.

Machine Tool Exposition—1960, Chicago, International Amphitheatre, September 6-16

NICAL SHEARS

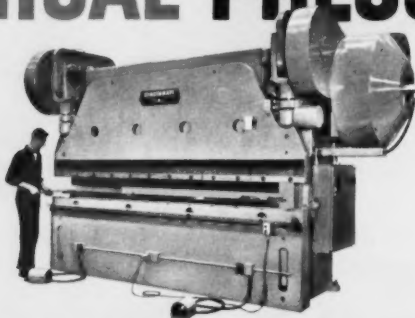


Speed up your plate cutting jobs with Cincinnati mechanical plate shears, represented by this Series 4312 Cincinnati Shear ($\frac{1}{2}$ " x 12' mild steel capacity).



See this new Cincinnati Hi-Speed Shear cut 18 ga. x 24" coiled stock at 200 strokes per minute. Used in conjunction with automatic coil-feeder-straightener.

NICAL PRESS BRAKES



The new 225 ton, 9 Series x 10' Cincinnati Automatic Cycle Press Brake demonstrates high-speed sheet metal forming without "clutch-slipping," "whip-up" or "back-bends." See the first real solution to high speed production with automatic bending action.

For more data circle 341 on Postpaid Card

THE CINCINNATI
SHAPER CO.



Cincinnati 11, Ohio, U.S.A.

In Scotland: The Cincinnati Shaper Co., Ltd., Glasgow

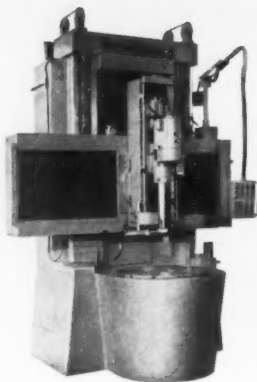
Vertical Universal Grinders

Springfield vertical universal grinders are among the most versatile tools you can use for *both* production and toolroom work. Head is easily positioned to grind ODs, IDs, surfaces, offsets and undercuts in *any* combination, generally with one chucking. Work may be regular or irregular in shape, up to 48" high with up to 52" swing on standard machines. Weight of workpiece is no problem because gravity works for you in vertical grinding — helps achieve extreme micro-inch finish and concentricity.

A typical example of a Springfield's remarkable precision is its ability to grind taper valve plugs and seats with one angle setting of the head—and get 95% blue or better on a taper gage with surface finish smoother than 30 RMS.

For high production, sometimes involving automatic loading, cycling, size control and unloading, Springfield builds special vertical grinding machines. Most of these can be reset when part changes occur. Another area in which Springfield has pioneered is in vertical contour grinding machines that handle missile parts.

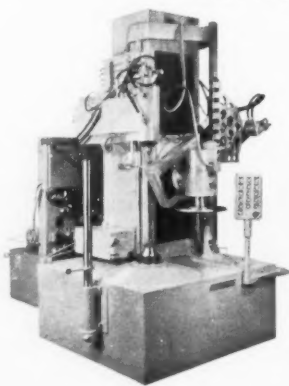
If you would like to know more about Springfield vertical grinders, please write for Bulletin 197-G.



model 3-TR
52" swing



new developments coming!

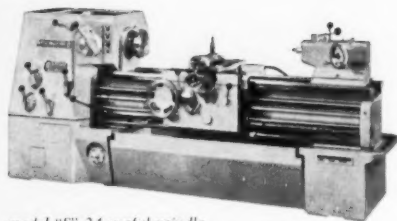


vertical
contour
grinder

SPRINGFIELD

The Springfield Machine Tool Company
Springfield, Ohio

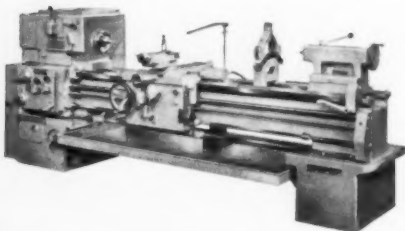
For more data circle 342 on Postpaid Card



model "S" 24 useful spindle
speeds, 66 feeds & threads
heavy duty 16"
medium duty 20"



new developments coming!



model 280 16 useful spindle
speeds, 60 feeds & threads
heavy duty 14", 16"
medium duty 20"

*The Springfield Machine Tool Company
Springfield, Ohio*

Engine & Toolroom Lathes

Springfield lathes have 10, 15 or 20 horsepower motors for heavy cuts, and have simple, practical features that keep the operator productive and keep the maintenance man away. Pressurized mist lubricates the headstock. Only four gears are in mesh for a given speed—the others run free. Clean, functional design and simplified controls promote pride of workmanship and minimum waste motion.

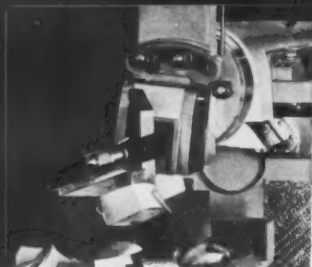
Ruggedness with precision has always been characteristic of Springfield lathes—because they are built to one standard of excellence. A Springfield engine lathe meets the accuracy standards set up for toolroom lathes—without any cost penalty.

Whenever you want maximum power and efficiency, and the cost designed out by designing simplicity in, consider a Springfield lathe. A full range of attachments is available—hydraulic contouring and reproducing, plain and universal relieving, taper, etc.

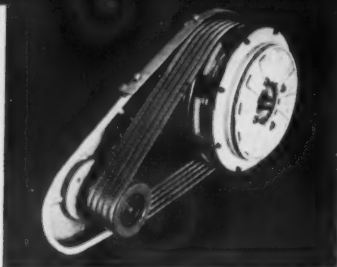
If you would like to know more about Springfield lathes, please write for Bulletins 190-G and 201-G.

SPRINGFIELD

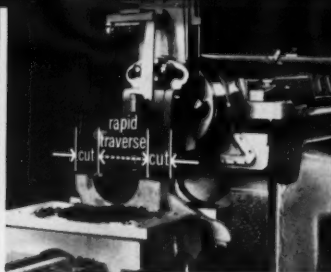
For more data circle 343 on Postpaid Card



1. This 2" cut, .030" feed, proves the ability of the Cincinnati's 50 psi automatic lubrication to maintain oil films under the heaviest loads.



2. Brushless electromagnetic brake and clutch insure fast, easy operation of the ram without grab. They never need adjustment.

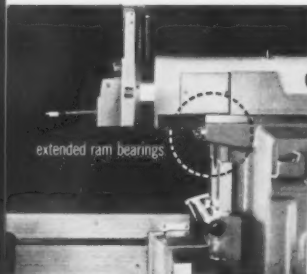


3. Both vertical and horizontal rapid traverse are standard Cincinnati features which profitably reduce time between each cut.

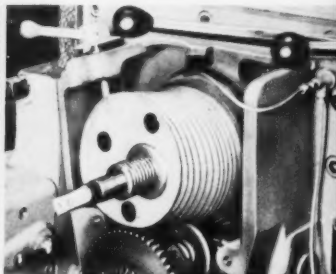
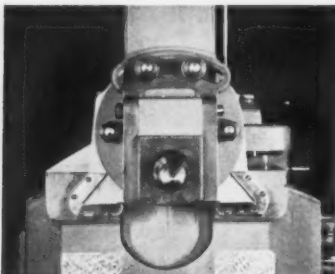
4. Extended ramway bearings increase ram support and minimize wear. Full table clearance to column provides the closest-coupled combination in the field.

5. Solid ramways, free of joints, hold the accuracy of Cincinnati shapers longer than others. Vee ways are cast integrally with the column for extra strength.

6. Individual cams for each feed, with follower always in contact give you a smooth (instead of a "bump") feed; results in superior finish on every job.

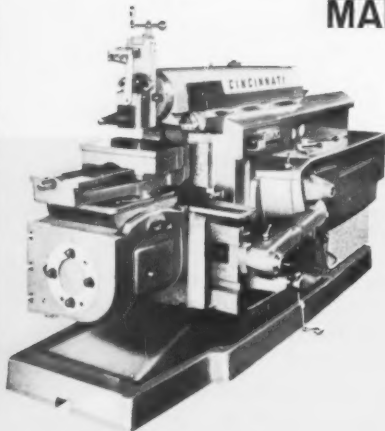


extended ram bearings



payoff features

MAKE CINCINNATI® SHAPERS
YOUR BEST CHOICE



Shapers / Shears / Press Brakes

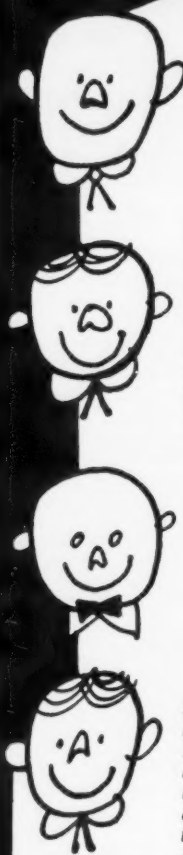
THE **CINCINNATI**
SHAPER co.



Cincinnati 11, Ohio, U.S.A.

In Scotland: The Cincinnati Shaper Co., Ltd., Glasgow

For more data circle 344 on Postpaid Card



Everyone
who uses small presses
can *PROFITABLY* use
HYDROLAIR

Elmes HYDROLAIR® is specially designed to meet ALL small-press needs in metal-working and plastics—on job shop or production work.

A full oil-hydraulic press without motors or pumps, HYDROLAIR *operates directly from your shop air line.*

ECONOMICAL . . .

COMPACT . . .

VERSATILE . . .

**EASY TO OPERATE
and MAINTAIN**

Elmes 50-ton HYDROLAIR—30, 50, 75 and 100-ton models with hand lever control; 50-ton model also available with electrical control. All models adaptable for optional standard modifications.

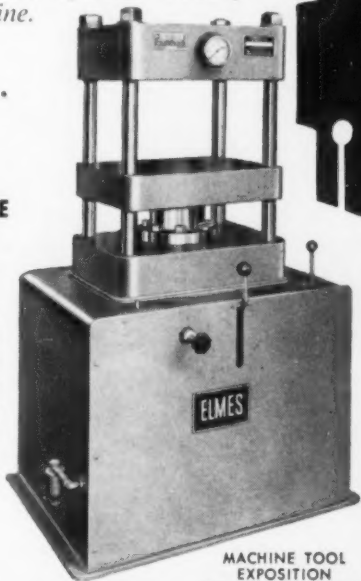


Get ALL the facts—
write for Catalog 1036-C.

American Steel Foundries/ELMES-KING Division
1170 Tennessee Avenue, Cincinnati 29, Ohio

ELMES Hydraulic Presses and Equipment

KING Vertical Boring and Turning Machines



MACHINE TOOL
EXPOSITION
CHICAGO, Sept. 6-16



For more data circle 345 on Postpaid Card

...DOES TOUGH JOBS Dependably, Profitably

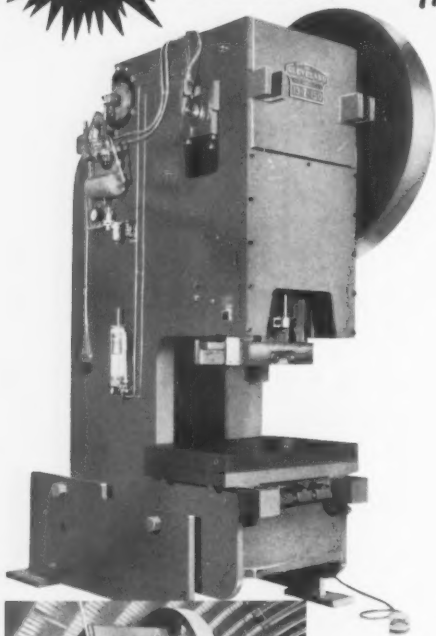
CLEVELAND



WELDED-FRAME
COST-CUTTING

*Open Back
Inclinable*

PRESSES



At the Middletown Manufacturing Co. in Middletown, Ky., this new welded-frame Cleveland OBI Press is blanking and piercing $\frac{1}{8}$ "-thick steel for reclining chair fixture parts and blanks for compressor cases. This Model 13-1 has 150-ton capacity, 6' stroke of slide, 4" slide adjustment, 30 x 45" bed area and operates at 35 strokes per minute.

A 2061A

● Stronger structural frame—streamlined and built to withstand the shock and vibration of heavy-duty stamping.

Dies last longer with less downtime for die maintenance due to Cleveland's large box-type slide that results in greater production accuracy.

75 to 200-ton capacity, built for safer, more efficient operation with all gears and drive mechanism guarded.

Ruggedly built for many different press operations, material can be fed in from either side or from front to back.

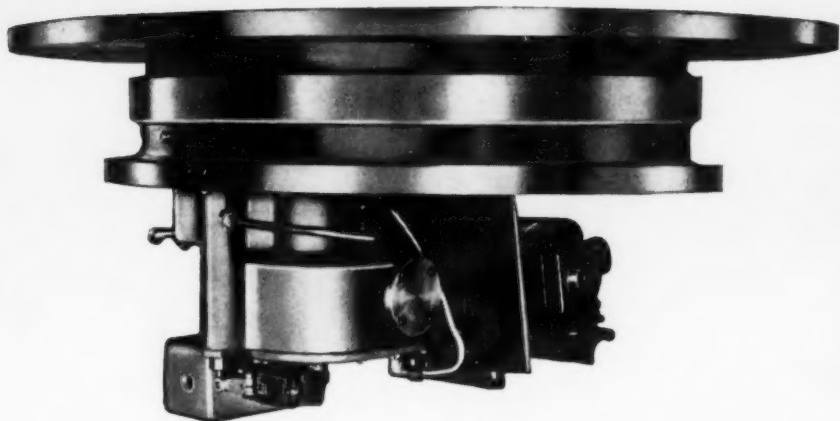
Three different positions—vertical, 15° and 30°—to accommodate various types of dies and at the same time make use of gravity feed and discharge in automated production lines, or in operations using a single press.

You get better stampings for less with a CLEVELAND Press—the new welded-frame cost-cutting Cleveland OBI Press.

Write Today for
Cleveland's OBI Press
Catalog OBI 3-60



For more data circle 346 on Postpaid Card



indexes fast for drilling, tapping

This new line of Avey Automatic Index Tables offers fast indexing time of 1 to 4 seconds for drilling and tapping equipment.

You can get from 4 to 15 index stations, and you can count on .001" accuracy between indexes at the indexing pin radius. The table can be easily interlocked with your drilling or tapping units for automatic operation.

Top diameters are from 16" through 80". As examples of the quality of these tables, the tool steel Geneva Plates have hardened and ground edges, and the index pin is hardened and ground.

You can mount the table on one of Avey's many standard machine bases, or you may prefer to fabricate your own. Wherever you use it, you'll be pleased at how quickly it pays for itself. For even or uneven indexing up to 192 positions, inquire about Avey's exclusive Electroindex tables.

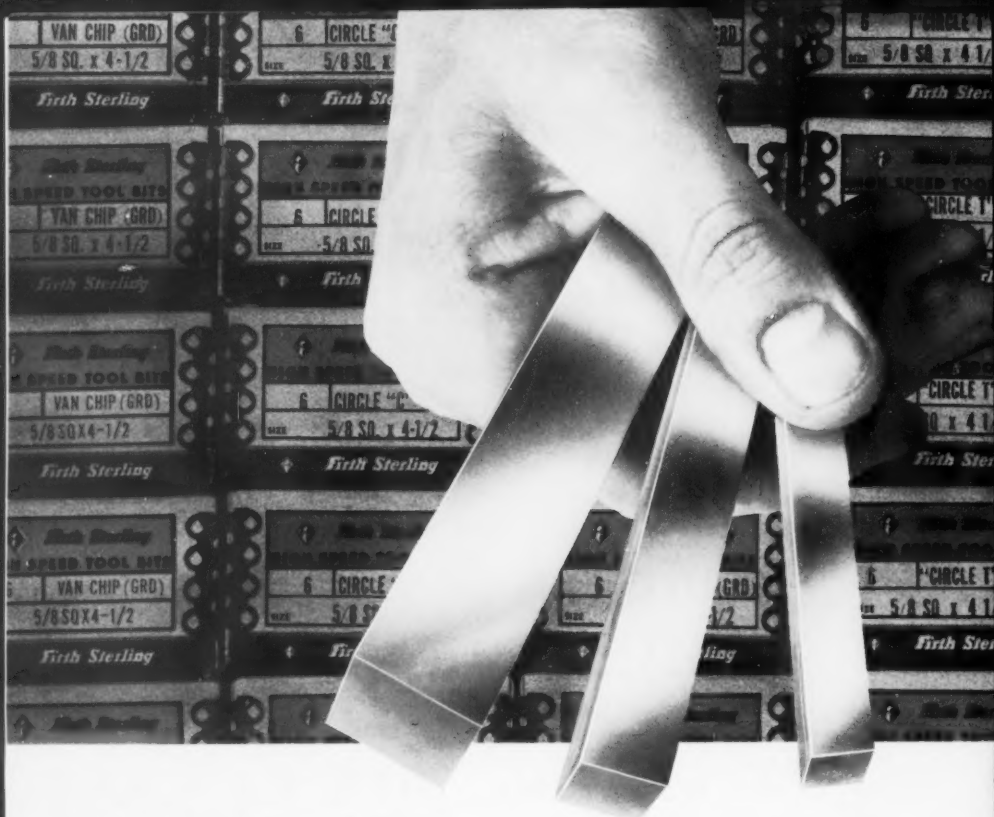
Avey Division, The Motch & Merryweather Machinery Co., P. O. Box 1264, Cincinnati 1, Ohio.



Write for bulletin



For more data circle 347 on Postpaid Card



PICK YOUR BITS for performance and service

CIRCLE C (T-5) (ground)

High Temperature Cutting

high cobalt-tungsten super high speed steel of well-balanced composition with superior red hardness and wear resistance.

VAN CHIP (M-3) (unground, ground)

General Purpose Cutting

high carbon, high vanadium moly-tungsten high speed steel with exceptional wear resistance and red hardness.

CIRCLE T-15 (T-15) (ground)

High Abrasive Cutting

tungsten base, high carbon, high vanadium cobalt high speed steel with superior abrasive resistance and red hardness.

SERVICE

YOUR FIRTH STERLING DISTRIBUTOR carries a complete range of standard sizes in clearly marked, durable packages. Call him today for quality products and dependable delivery.

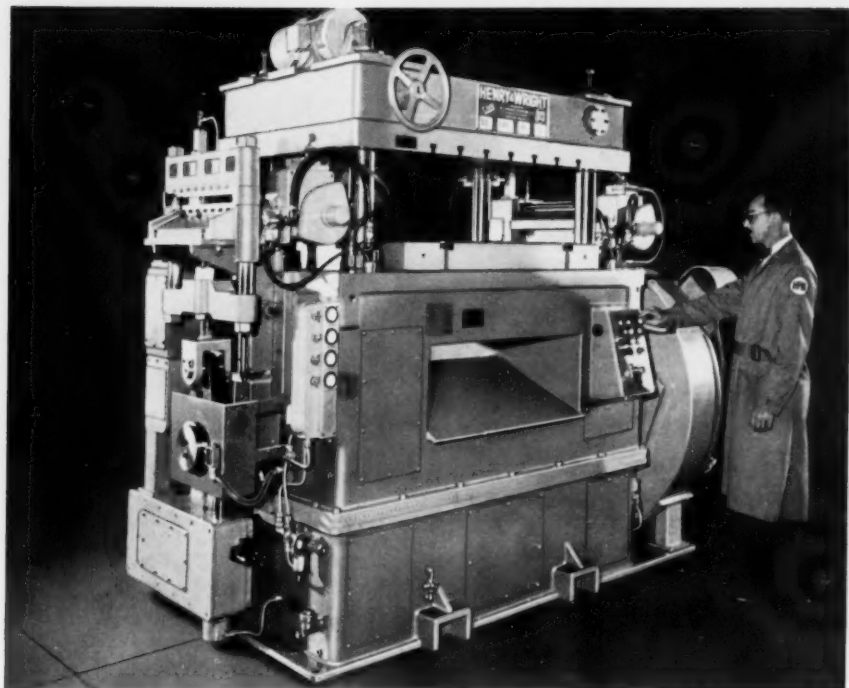


Firth Sterling

— INC —

3113 Forbes Ave., Pittsburgh 30, Pa.
Offices and warehouses in principal cities

For more data circle 348 on Postpaid Card



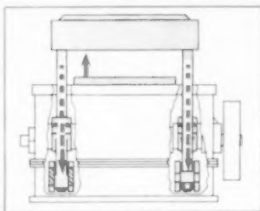
DOUBLE DIE-LIFE, DOUBLE PRODUCTION OUTPUT

with Henry & Wright Double-Crank Dieing Machines

The advantages of progressive stamping are adaptable to many everyday stamping jobs through Henry & Wright double-crank dieing machines. Four basic advantages place H & W's in a new competitive position:

- (1) Form larger parts on lower tonnage machines with double crank design;
- (2) provides greater precision and longer die life;
- (3) overall height is reduced to about half that of conventional straight side presses—less head room required;
- (4) they're more compact; sizes to 150-ton do not require a pit. Operator sees entire die bed while standing at controls.

Add these major production advantages to a design that reduces maintenance through automatic safety controls and the popularity of the new H & W's is quickly understood. Here's where you benefit:



- All principal bearings are lubricated by a motor-driven recirculating oil system, sealed against contaminants.
- Crankshaft bearings are thermal-switch controlled. Press cannot operate except within safe temperature limits.
- Lower base is insulated against vibration and pounding.
- Discharge chutes are conveniently located for stackers or automatic conveyors.

• Air pressure is used on the feed rolls instead of springs. Easier to adjust, release, last longer. Feed pitch can be changed while machine is in operation.

• Dies may be inserted from front or rear without moving roll feed. Faster die set-ups save valuable time.

The ability to properly handle off-center loading with more uniform distribution of applied force is probably the greatest advantage for large stamping production. Greater accuracy, better quality and longer die life are natural results. Find out about these new, cost-reducing dieing machines. Write for new Catalog.



**THE HYDRAULIC PRESS
MFG. COMPANY**

A Division of Koehring Company
Mount Gilead, Ohio, USA

For more data circle 349 on Postpaid Card

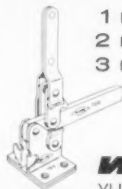


There's a **WESPO** clamp or plier for every clamping job!



80 models and sizes...

*made better three ways to
give more positive holding,
last longer!*



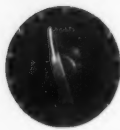
- 1 Reamed holes
- 2 Hardened serrated bushings
- 3 High tensile strength rivets

send for free catalogs describing Wespo clamps and fixture details

WESPO DIVISION
VLIER ENGINEERING CORPORATION
Formerly West Point Manufacturing Company
26935 W. Seven Mile Road • Detroit 19, Michigan

For more data circle 350 on Postpaid Card

Here's Why Accurate Honing Is Easier On The New Barnesdril Model 244...



Hone Feed—simple dial gives infinite adjustment.



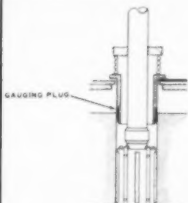
4-Speeds—turn of knob selects desired speed rate.



Reciprocation—length of stroke selected by convenient dial.



Set-Up—controls under lock and key.



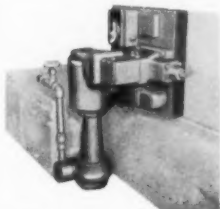
Plugmatic—automatic sizing assures accuracy within .0002".



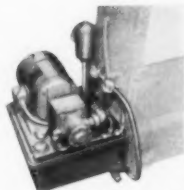
Operating Controls—mounted at shoulder height.



All Electric Controls—enclosed inside machine column.



Coolant Pump and Hydraulic Valves—easily accessible.



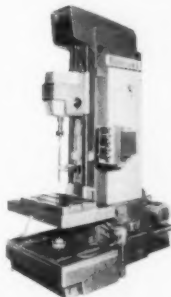
Hydraulic Pump—in open, for easy maintenance.

Barnesdril offers a completely new honing machine for high production honing of bores $\frac{1}{2}$ " to 6" in diameter. Large diameter applications depend upon amount of stock removal, bore length, and material. Machine is available with one or two spindles and a choice of three stroke lengths: 15", 25", or 40". For complete details see your Barnesdril representative or write for new bulletin H-112 today!



BARNES DRILL CO.

860 CHESTNUT STREET • ROCKFORD, ILLINOIS
DETROIT OFFICE: 13121 PHILANT AVENUE



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FINISH:

*Reason enough
to buy LeBlond*

The glass industry is beginning to turn to mold plungers hard-surfaced with Colmonoy 6 to withstand the corrosion of molten glass. At 57-59 Rockwell C hardness, you don't machine such plungers on ordinary lathes—if you can machine them at all.

Yet Overmyer Mould Company of Winchester, Ind., turns Colmonoy coated plungers in 3 passes to a 10 micro-inch finish. That's more than fine enough to use as-machined.

Overmyer does it with 15" LeBlond Dual-Drive Lathes equipped with LeBlond tracers and constant surface speed control. From 1000 rpm at start of cut to 125 rpm at finish the Dual-Drives supply smooth, vibrationless power.

Rock-steadiness for turning rock-hard materials . . . Rigidity without excess weight or size . . . These are strong reasons to buy a lathe. They are reason enough to buy LeBlond.



THE R. K. LeBLOND MACHINE TOOL CO.
World's Largest Builder of a Complete Line of Lathes
CINCINNATI 8, OHIO



See LeBlond Booth 310
at the Machine Tool
Exposition in Chicago,
September 6-16.

McGraw-Hill

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August, 1960

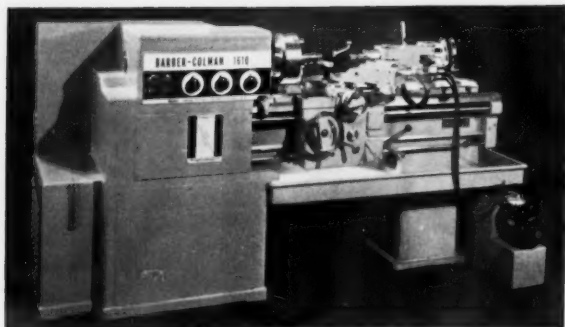
MODERN MACHINE SHOP

49

A New Concept in Lathes



New Barber-Colman
"specialist" lathe features
16" and 20" swing and infinitely
variable feeds and speeds



See the 1610 with tracer
at 1960 Machine Tool Exposition ...
Booth No. 923.

Barber-Colman's new 1610 lathe with 16" or 20" swing and 6½ hp motor is a "specialist" lathe for turning, facing, and boring—and there's a place for it in every lathe department. Setup time is reduced, and production is increased 100% or more on many jobs. You might hesitate, at first, before buying a precision lathe that cannot be used for threading. But greater speed and feed control for those who want productivity and precision at a saving produces several practical benefits.

Low initial cost—You can purchase a Barber-Colman 1610 (equipped with tracer attachment) for approximately the same price as a toolroom lathe of the same rated capacity and quality. If other lathes are available for threading, this lathe is the most economical one to use for high-speed turning, facing, and boring. This lathe is also available as a 1610-13 for high-speed machining of parts which require 20" swing over the ways.

Why put low-speed work on a high-speed lathe?

Since threading normally requires slow speeds, older toolroom lathes can be used economically for cutting threads. Put your turning, facing, and boring operations on this lathe to take full advantage of its high speeds (up to 2000 rpm) and infinitely variable feeds and speeds.

Control of feeds and speeds—Spindle speed of this 1610 is instantly, independently, and infinitely variable to any speed in its available range. Even during the cut, the operator can change spindle speeds just by turning a dial on the headstock. No time is lost shifting gears or stopping the machine.

Power feed to both carriage and cross slide is infinitely variable, also. There are no gears to shift—just a simple dial on the headstock. Feed per revolution can be varied from .0001" to .488", depending upon the speed range of the machine.

On high stock removal jobs, you can rough to within a few thousandths of final size, then take a quick finishing cut. The ease with which Class B operators can control feeds and speeds assures finer, more uniform finish, maximum machine utilization, and economical tool life on every job.

Simple tracer setups—Experience proves that less than 20 minutes is needed to set up the Barber-Colman hydraulic tracer. This is possible because the stylus can be positioned independently of the tool slide—the valve responds to pressure from any direction. Front mounting makes it easy to change over—chips don't pile up on the template. The lathe can be operated manually without removing the tracer, or the attachment can

be replaced with the regular compound in less than ten minutes. Tracer operates from 0° to 90° with the work axis, and controls the machine consistently within .001" on diameter or length.

Quality, versatility and economy

Convenient controls—particularly the five-position, turret-type longitudinal feed stop—simplify operation even at peak production efficiency. This feed stop is particularly advantageous for multiple-diameter turning because it eliminates scale readings and reduces skill requirements. It is one of many standard features on the 1610—simple, easy to use, and trouble-free.

Obviously, this is another Barber-Colman quality machine that will turn out toolroom quality work. Phone your Barber-Colman representative or write us for descriptive literature and complete specifications. Ask for Bulletin No. 9061-1.

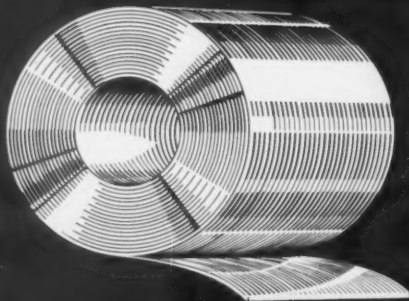
Barber-Colman Company



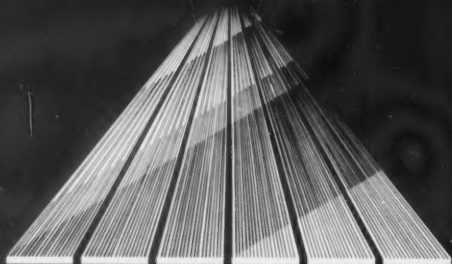
64 Loomis Street, Rockford, Illinois

For more data circle 353 on Postpaid Card

... from start



... to finish



ROTARY SLITTING LINES

**PIPE AND TUBE MILLS (ferrous or non-ferrous)
COLD ROLL FORMING MACHINES**

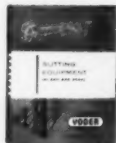
YODER ROTARY SLITTERS

If your slitting requirements call for coil widths from 12" to 60", in gauges from .015" to .250", the economy of purchasing Yoder Slitting Machinery can be yours. Operating a Yoder Slitting Line only one eight-hour shift per week, for example, could easily produce 35 tons of slit strands per week... or 1,820 tons every 52 weeks. At a slitting cost saving of only $\frac{1}{2}\%$ per pound, the annual savings would amount to \$18,200.

Additional savings can be realized through lowered inventory of mill-width coils—less waiting for delivery of special slit widths. Also, customer satisfaction will increase as you achieve faster completion and delivery of finished products.

At your request a Yoder sales engineer will study your plant operation to determine what equipment would most economically... and profitably... serve you, whether it be standard components or a completely specialized and engineered line.

Send for this illustrated text on slitting operations and equipment. It describes methods, time studies, operating cycles, material handling, and gives full specifications.

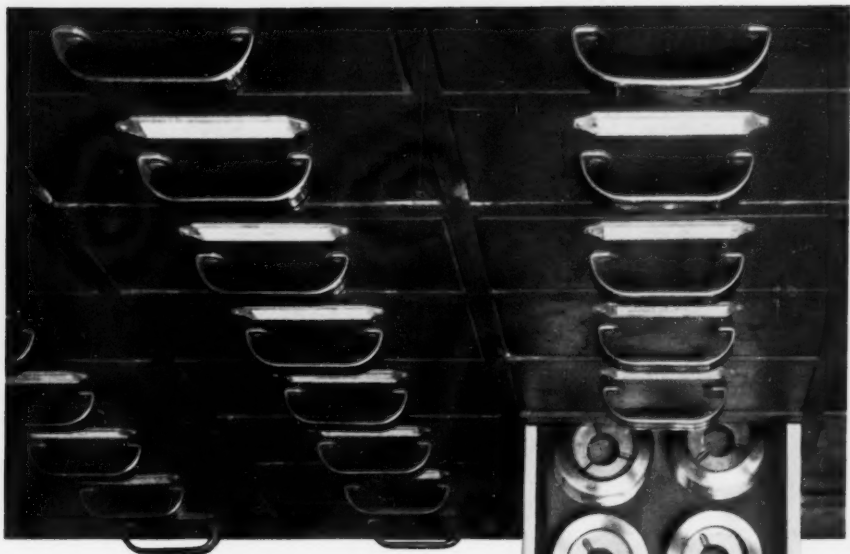


THE YODER COMPANY

5532 Walworth Ave. • Cleveland 2, Ohio



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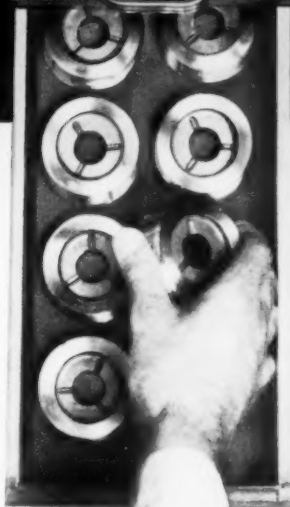


Standard Thread Plug and Ring Gages are Stock Items at Pipe Machinery

At Pipe Machinery, where prompt service is a basic precept, we maintain an extensive stock of standard thread plug and ring gages in a complete range of sizes through 1½".

Minutes after we receive your order, your gages can be taken from a storeroom drawer, assembled, packaged, stamped and in the mail bag ready for shipment.

For more complete information on the American Standard, NEF, Unified and pipe size gages we have available for immediate delivery, write us on your company letterhead today.



THE PIPE MACHINERY COMPANY • 29100 Lakeland Boulevard • Wickliffe, Ohio • Greater Cleveland

For more data circle 355 on Postpaid Card

August, 1960

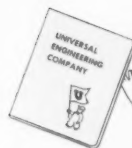
MODERN MACHINE SHOP 53



for speed and accuracy in production
it pays to use UNIVERSAL DRILL BUSHINGS

UNIVERSAL ENGINEERING COMPANY • FRANKENMUTH 9, MICH.

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Write for complete
catalog, today!



214



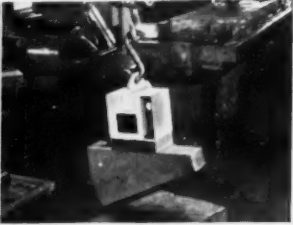
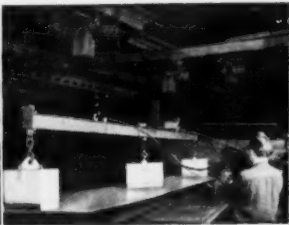
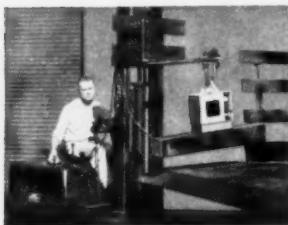
Lift Magnets

Battery-Operated for Faster, Safer Materials Handling in the Shop and Yard

Sundstrand "Power-Grip" battery-operated lift magnets are completely self-contained, powered by a regular wet cell automotive battery stored in the magnet case. Length of haul isn't restricted by wires. Hitches, chains, and eye bolts are eliminated.

- Self-contained,

Remote control can be furnished for ease and safety in lifting large, awkward parts or for operating magnet from driver's seat of lift truck. Available in three sizes: 2,000, 4,000, and 8,000-lb lift capacity. Ask for Bulletin LM-1.



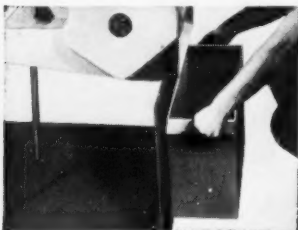
Coolant Separators

Speed Maintenance on Grinding, Honing and Gear Shaving Machines

Sundstrand coolant separators take only about an hour to install — place them right on open coolant tanks — no additional floor space is required.

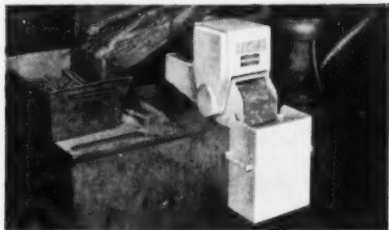
Longer wheel life, improved surface finishes, reduced downtime, and rejects are direct results. You also save because sump clean-

ing is eliminated — coolant life extended. Permanent alnico magnet separates particles and deposits them in a sludge pan which easily can be removed for cleaning, without any tools. Capacities from 25 to 100 gpm. Ask for Bulletin MS-1.



◀ Sludge pan easily removed

▶ Installation on internal grinder



SUNDSTRAND-AMERICAN BROACH

ANN ARBOR, MICHIGAN

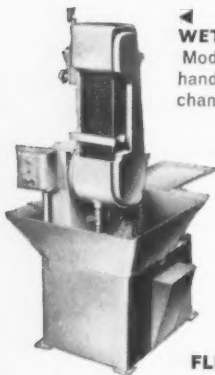
Division of SUNDSTRAND CORPORATION

For more data circle 357 on Postpaid Card

SUNDSTRAND

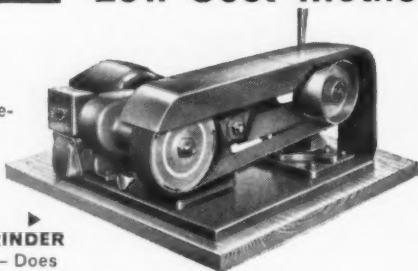
Belt Grinders

Low-Cost Method



WET-DRY GRINDER

Model 506 — For quick free-hand surfacing deburring, chamfering, rounding.

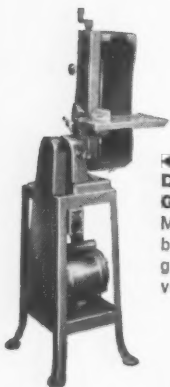


BENCH GRINDER

Model BBS — Does cleanup, deburring. Removes, flashings, risers, etc

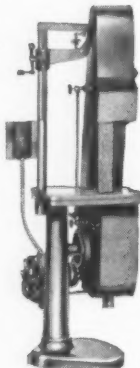
FLEXIBLE BELT

Model B6W — Flexible free belt grinds irregular contours.



DRY-BELT GRINDER

Model 648 — A budget-priced 6" grinder that adjusts vertically or horizontally.

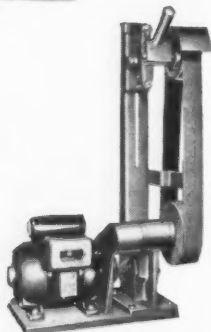
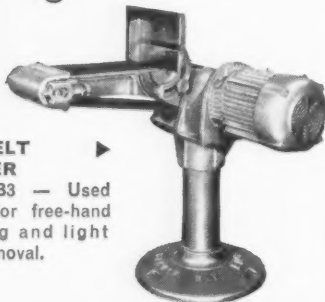


PLATEN GRINDER

Model WG4 — Grinds production runs of small parts to true flatness.

DRY BELT GRINDER

Model B3 — Used mainly for free-hand grinding and light stock removal.



UTILITY GRINDER

Model CN2 — Grinds on contact wheel, platen or free belt — horizontal or vertical.

SUNDSTRAND-AMERICAN BROACH

ANN ARBOR, MICHIGAN

Division of SUNDSTRAND CORPORATION

For more data circle 358 on Postpaid Card

of Stock Removal and Fine Finishing for Production, Maintenance, or Toolroom Use

With a minimum of machine investment, Sundstrand-Engelberg Utility Belt Grinders offer a wide range of cost-saving advantages to large and small shops for production, maintenance and repair, and toolroom work — anywhere a low-cost method of stock removal and fine finish is required.

A wide variety of material can be machined — all metals, wood, glass, plastic, and other nonmetallics. These grinders are unmatched for the free-hand application of work, requiring flat surfacing, deburring, chamfering, squaring ends, fitting, and polishing.

Belt grinders give you more grinding area — are sharper due to grain orientation for rapid stock removal — elimin-

ate costly truing and wheel dressing. Belts are less expensive than wheels — easier to store and handle.

From the many bench and floor models of Sundstrand-Engelberg belt grinders you can select the machine that ideally meets your needs. Platen and contact wheel types for flat grinding of broad areas; flexible belt types for finishing curved or irregular surfaces; wet grinding models for work that could be harmed by temperature changes.

Whatever your grinding needs, Sundstrand-Engelberg belt grinders can do the job quicker, easier, and more economically. Ask for Bulletin EU-1.



SUNDSTRAND Electric Sander

- Fast, Smooth Action, and Rugged Design Save Time and Money



Ask for Bulletin OE-900 and Bulletin 2102 for complete line of air sanders.

This new electric power sander, with its extra-large sanding orbit and big pad gives rapid stock removal and fine finishes on woods, metals, plastics. It weighs only 8½ lb — is shockproof-insulated and built to minimize noise and vibration.

Time- and moneysaving features

Single-phase motor drive has no belts or gears to wear out or cause trouble. High starting torque and constant speed operation virtually rule out overloading from misapplication.

Lifetime lubricated bearings help reduce maintenance.

Sturdy, advanced design eliminates need for commutator, brushes, capacitor, or centrifugal switch.

SUNDSTRAND MACHINE TOOL

BELVIDERE, ILLINOIS

Division of SUNDSTRAND CORPORATION

For more data circle 359 on Postpaid Card



Bench Centers

.0001" in Checking for Runout

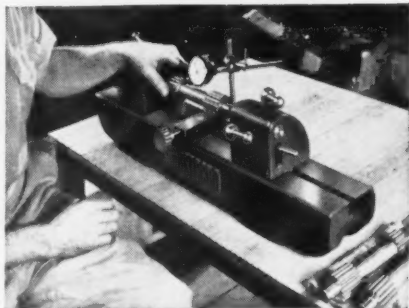
Precise check on runout of gears, sprockets, shafts, pinions, or almost any part that can be rotated on center is done easier, faster with .0001" accuracy on this Sundstrand bench center.

An extremely handy tool for production or inspection departments, it can be easily operated by unskilled workers.

Timesaving design with one-hand control over all moving elements leaves the operator's other hand free to control rotation, takes less time per piece — saves money. Ask for Bulletin 78-5.



- Accurate to Within

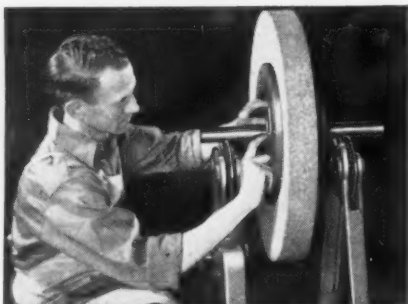


Balancing Tools

Detected Quickly, Easily, Accurately

With Sundstrand balancing tools, you can detect out-of-balance conditions as small as five grains in a 3" radius on a workpiece weighing 1½ lb. All sizes (except extra-heavy-duty) are portable and can be set up without leveling.

A size available for every job, whether it be airplane propellers, tires, cotton gin brushes, crankshafts, flywheels, cones, pulleys, polishing wheels, etc. Compact bench-top types and adjustable floor types from 12-lb to 24,000-lb capacity. Ask for Bulletin BT-1.



Fifty-five years of machine tool experience backs up every Sundstrand product. You profit with more features, more versatility, longer service life — more for your money.

Contact your local Sundstrand distributor today for more information on Sundstrand utility tools.

MARK OF



RELY-ABILITY

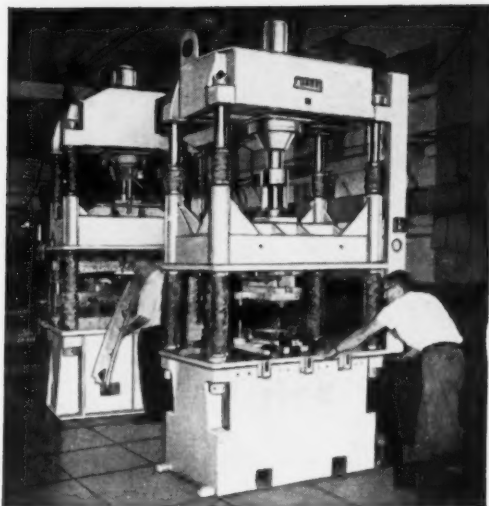
SUNDSTRAND-AMERICAN BROACH

ANN ARBOR, MICHIGAN

Division of SUNDSTRAND CORPORATION

For more data circle 360 on Postpaid Card

Two DAKE DIE TRYOUT PRESSES in Custom Die Shop?



Greenville Tool & Die Company, Greenville, Michigan, purchased a 150-ton Dake Hydraulic Die Tryout Press to relieve the workload on their mechanical facilities. After delivery, management discovered that the backlog of work for the Dake press was far greater than it was for the mechanical presses. Its smooth, accurate operation enabled it to easily handle press work that would otherwise be difficult or impossible. A second Dake Hydraulic Die Tryout Press was installed because no other press could do as much work so well.

The Dake Die Tryout Presses can be stopped and reversed at any point in the stroke—diemakers can see just when and why blanks are “dragging” or “tearing,” and their large daylight area allows the die to be “barbered” without removing it from the press.

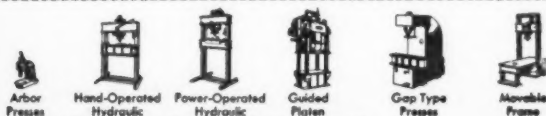
At the Greenville Tool & Die Company, Dake presses are also used to align punches, “shear-in” irreg-

ularly shaped surfaces, develop blank sizes and shapes, find the right redraw depths, and even straighten heat-treated die parts.

Dake Die Tryout Presses are available in 9 standard models from 25-ton to 300-ton capacity, and in custom engineered models to 600-ton capacity to meet special requirements. Send for Bulletin No. 330 for specifications.

DAKE CORPORATION, 612 Robbins Road, Grand Haven, Michigan

**DAKE
PRESSES**



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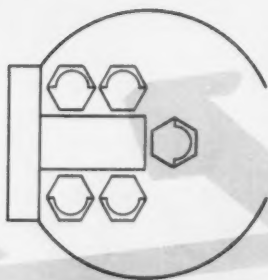
Fosmatic 54 P Precision
Boring Machine with
tape control of
saddle, table, spindle,
head and automatic
tool changing

new

Fosmatic 44 PG Jig
Grinder with
preselect dial
control and
automatic
positioning

Fosmatic 32 PG Jig
Grinder with
automatic
positioning

new



5 BM Sensitive Drill
with variable speed
transmission

new

Fosmatic Three-
axis Turret Drill
—numerically
controlled

new

4' Sensitive Radial Drill

6' 17" Fosmatic
Radial Drill

Sensitive Two-axis
Drill—numerically
controlled

new

5 BM Sensitive
Drill with gear
transmission

new

Fosmatic 42 P Jig
Borer with Direct
Dial Dimensioning



new *at the show* BOOTH 800

Rest your tired production worries here.

Chasing that elusive last ten-thousandth inch? Here are machines guaranteed to work to that 4th decimal place on a production basis. Now Fosmatic Precision Boring Machines are completely automatic, with numerically controlled saddle, table, spindle, head, and tool changer. This is NEW. See them at The Show. Booth 800.

Now famous Moore-Fosdick Jig Grinders have automatic positioning and numerical control. This is NEW. See them at The Show. Booth 800.

Now Fosdick has Numerically Controlled Drilling Machines, versatile and fast. Here's an end to a frozen investment in drill jigs and fixtures. They're NEW. See one at The Show. Booth 800.

Drilling speed like you never saw before, with a battery of tools at the command of a button. It's yours with Fosdick's brand NEW Turret Drill. See it in Booth 800.

And that isn't all that's new. Come to booth 800 and see for yourself.

See Fosdick in action at the
Machine Tool Exposition,
Chicago, September 6-16.

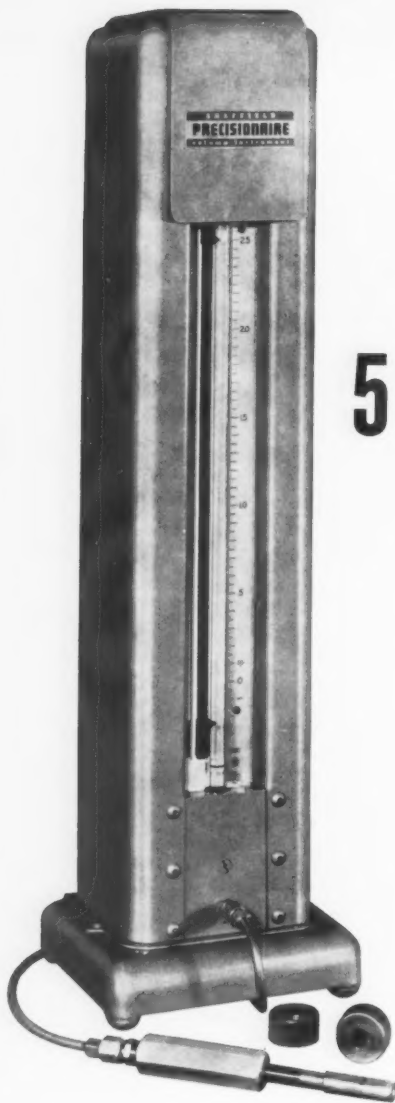
MMTPE

Get a proposal from Fosdick.

FOSDICK

THE FOSDICK MACHINE TOOL COMPANY
Cincinnati 23, Ohio

For more data circle 362 on Postpaid Card



New Long-Range 15" Precisionaire® Column Instrument Now backed by **5 Year Warranty**

For all cost-conscious gage buyers, Sheffield's new 5-year Quality and Reliability Warranty on Precisionaire Column Instruments shipped with Sheffield gaging tooling is important news. In addition, 15" Precisionaire Column Instruments are now supplied in multi-column models, with 5000 to 1 and 10,000 to 1 amplifications. (Higher amplifications up to 100,000 to 1 obtained with Super-Amp Package.)

This instrument doubles gaging range, cuts initial gage cost, reduces gage inventory and upkeep.

You can inspect wider part tolerances at higher amplification with greater accuracy and speed.

You can classify parts into more size increments with a wider scale spread for each class—fewer borderline cases.

You can better control in-process gaging because of greater approach or "come-up" range.

Amplification of Plunjet® gaging cartridges is doubled and full amplification is obtained when gaging small diameters.

Call your local Sheffield representative for a demonstration or write Dept. 12.

The

SHEFFIELD

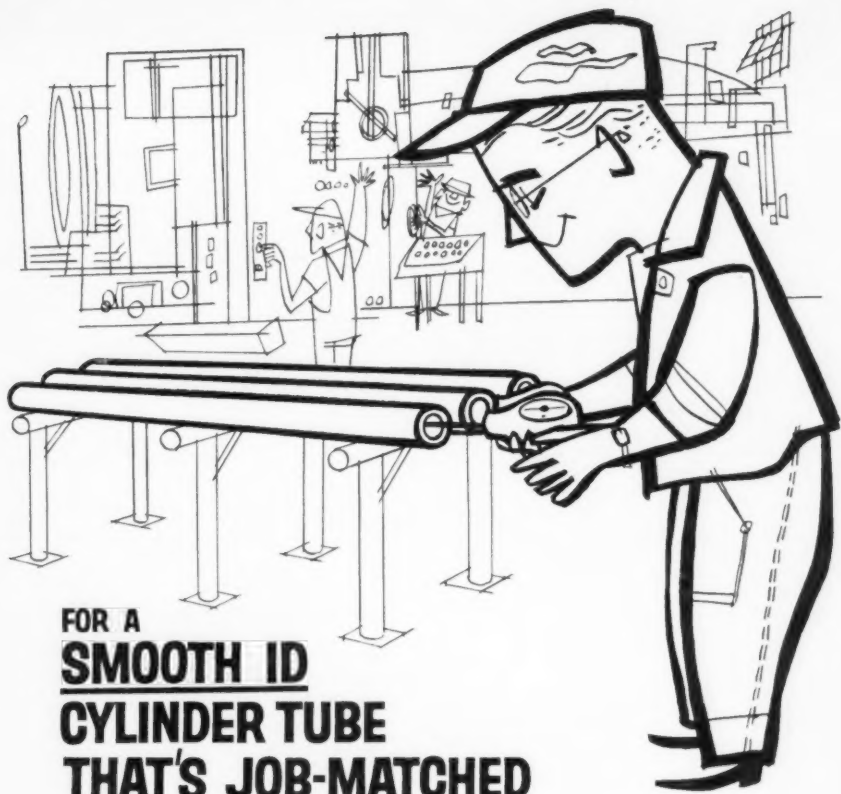
Corporation

Dayton 1, Ohio

A subsidiary of the Bendix Corporation

Gages, Measuring Instruments, Automatic Gaging & Assembly Systems • Machine Tools • Contract Mfg.

For more data circle 363 on Postpaid Card



**FOR A
SMOOTH ID
CYLINDER TUBE
THAT'S JOB-MATCHED
SPECIFY**

B&W Lectrosonic steel cylinder tubing

With B&W LECTROSONIC you get . . .

- guaranteed maximum micro-inch finish on the ID to meet cylinder tubing requirements
- uniformity of wall thicknesses and close ID tolerances
- guaranteed physical properties to insure adequate strength
- tough, lightweight electric-resistance-welded cylinder

tubing that costs less than seamless in comparable sizes. Manufactured under a rigid system of quality control B&W LECTROSONIC Cylinder Tubing is a sound, uniform tube which will fabricate easily and give optimum service life. For more information, call your local B&W District Sales Office, or write for Bulletin T-459, The Babcock & Wilcox Company, Tubular Products Division, Beaver Falls, Pennsylvania.



TA-9032-WM

B&W

THE BABCOCK & WILCOX COMPANY

TUBULAR PRODUCTS DIVISION

Seamless and welded tubular products, solid extrusions, seamless welding fittings and forged steel flanges—in carbon, alloy and stainless steels and special metals

For more data circle 364 on Postpaid Card

August, 1960

MODERN MACHINE SHOP 63

How to cut a keyway in 1 minute with a *Minute Man*[®] keyway broach kit



MINUTE MAN

KEYWAY BROACH KIT

comes complete with broaches, bushings and keystock. For keyways from $\frac{1}{16}$ " to 1" in any bore from $\frac{1}{4}$ " to 3".



1. Select the right size broach for the bore (sizes are plainly marked).

2. Insert the right size broach in the bushing slot.

3. Place under an arbor press and press through.



The duMONT CORP., Greenfield, Mass.

MAIL FREE BROACH CATALOG AND PRICE LIST S describing Square, Round and Hexagon Broaches, Production Type Keyway Broaches and Keyway Broach Kits to

Name.....

Company.....

Address.....

duMont

For more data circle 365 on Postpaid Card

Meetings

Important Meeting

Dates

★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★

SEPTEMBER 3-4 • American Machine Tool Distributors Association, Annual Meeting, LaSalle Hotel, Chicago. Association headquarters: 1900 Arch St., Philadelphia 3, Pennsylvania.

SEPTEMBER 6-16 • National Machine Tool Builders' Association, Machine Tool Exposition, International Amphitheatre, Chicago. Information: Clapp & Poliak Inc., 341 Madison Ave., New York 17, New York.

SEPTEMBER 6-16 • Production Engineering Show, Navy Pier, Chicago. Information: Clapp & Poliak Inc., 341 Madison Ave., New York 17, New York.

SEPTEMBER 7-15 • Coliseum Machinery Show, Coliseum, Chicago. Information: A. Byron Perkins & Associates, 2807 Sunset Blvd., Los Angeles 26, California.

SEPTEMBER 12-13 • Material Handling Institute Inc., Fall Meeting, Cavalier Club, Virginia Beach, Va. Information: Hanson & Shea Inc., 1 Gateway Center, Pittsburgh 22, Pennsylvania.

SEPTEMBER 14-15 • American Die Casting Institute, Annual Meeting, Edgewater Beach Hotel, Chicago. Institute headquarters: 366 Madison Ave., New York 17, New York.

SEPTEMBER 18-21 • Packaging Machinery Manufacturers Institute, Annual Meeting, Otsego Ski Club, Gaylord, Mich. Institute headquarters: 60 E. 42nd St., New York 22, New York.

SEPTEMBER 19-20 • Steel Founders' Society of America, Fall Meeting, Homestead Hotel, Hot Springs, Va. Society headquarters: 606 Terminal Tower, Cleveland 13, Ohio.

SEPTEMBER 22-23 • National Foundry Association, Annual Meeting, Edgewater Beach Hotel, Chicago. Association headquarters: 53 W. Jackson Blvd., Chicago 4, Illinois.

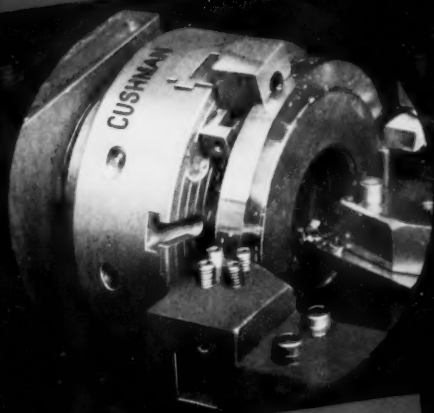
BULLETIN NO. PD 66D

CUSHMAN

air
operated

CHUCKING EQUIPMENT

*George—This looks like the
answer to our problem.
Have their rep. come in.
HRC.*



- INCREASES PRODUCTION
- LOWERS COSTS
- REDUCES FATIGUE
- IMPROVES QUALITY
- DECREASES FLOOR-TO-FLOOR TIME

PRODUCTION
ENGINEERING
SHOW DEPT. 8-16
1966
SAVE PERL CHICAGO
BOOTH NO. 126

For more data circle 366 on Postpaid Card

THE CUSHMAN CHUCK COMPANY • HARTFORD 2, CONNECTICUT

Announcing:

.....

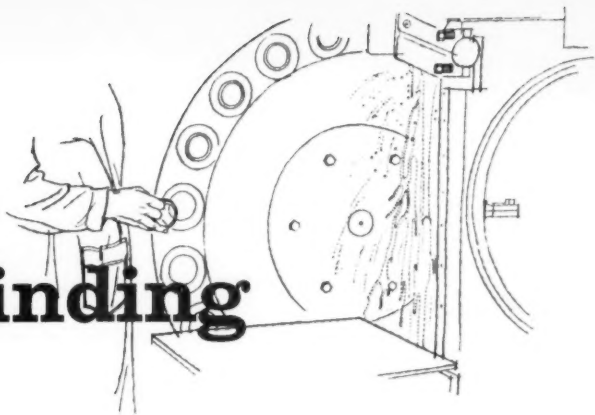
A new high in
set by

B14

*New Norton
Resinoid Bonded
DISCS*



disc grinding



Under development and testing for years . . . now available as the finest wheels of their type ever made.

The latest news-making achievement in Norton product development is the B14 resinoid bond for disc wheels.

It took several years to perfect this bond. It also took many months to complete nation-wide testing of the new B14 discs, on all types of disc grinders — on jobs ranging from snagging to precision finishing, and on ferrous, non-ferrous and non-metallic materials. The tests were entirely comparative.

Results of this across-the-board testing are outstanding. The new B14 discs have proved beyond question their ability to grind more workpieces per disc . . . faster and better, with fewer dressings . . . and with constant uniformity throughout extra long disc life.

Have your Norton Man, a trained Abrasive Engineer, study your requirements and make trial runs of the B14's you need — solid discs or segmental, ALUNDUM* or CRYSTOLON* abrasive. Or get details from your Norton Distributor or write to NORTON COMPANY, General Of-

fices, Worcester 6, Mass. Plants and distributors around the world.

*Trade-Marks Reg. U.S. Pat. Off. and Foreign Countries

A few of many reports from Norton customers . . . PROVING B14 DISCS THE BEST

JOB: Rough grinding iron castings, 3½" x 2½".

REPORT: B14 37 CRYSTOLON wheel ground 6,000 parts with one dressing. Best previous disc gave 4,500 parts with 4 dressings.

JOB: Surfacing cold rolled steel washers on double disc machine.

REPORT: B14 19 ALUNDUM discs impressive as best so far, with very even wear.

JOB: Double-disc grinding Alnico magnets.

REPORT: B14 — mixed abrasive wheel thoroughly approved for new orders.

JOB: Rough grinding miscellaneous parts on double end machine.

REPORT: B14 44 ALUNDUM discs performed better, lasted longer than all other types.

NORTON
A B R A S I V E S

W-1992

75 years of . . . Making better products . . . to make your products better

NORTON PRODUCTS: Abrasives • Grinding Wheels • Machine Tools • Refractories • Electro-Chemicals

BEHR-MANNING DIVISION: Coated Abrasives • Sharpening Stones • Pressure-Sensitive Tapes

For more data circle 367 on Postpaid Card

DO YOUR OPERATIONS DEMAND ACCURATE CENTERS?



Ex-Cell-O Center Lapping Machines Increase Accuracy, Reduce Scrap!

Precision Center Lapping Machines remove heat-treat scale, and eliminate roughness and distortion of centers to insure accuracy in subsequent operations.

Easy to use and modestly priced, Center Lapping Machines include as standard, inbuilt equipment Ex-Cell-O Precision Spindle and manual diamond dresser.

See your Ex-Cell-O Representative, or write for Bulletin 40271.

BEFORE LAPPING

- Out of line
- Out of round
- Incorrect angle
- Rough or torn



AFTER LAPPING

- Perfect alignment
- True roundness
- Precise angle
- Mirror-smooth



40-72

EX-CELL-O FOR PRECISION

MANUFACTURERS OF PRECISION MACHINE TOOLS • GRINDING AND BORING SPINDLES • CUTTING TOOLS
• DRILLING REAMERS • TORQUE ACTUATORS • CONTOUR PROJECTORS • GAGES AND GAGING EQUIP-
MENT • GRANITE SURFACE PLATES • AIRCRAFT AND MISCELLANEOUS PRODUCTION PARTS • ATOMIC
ENERGY EQUIPMENT • RAILROAD PINS AND BUSHINGS • DAIRY AND OTHER PACKAGING EQUIPMENT

Machinery Division

EX-CELL-O
CORPORATION
DETROIT 32, MICHIGAN

For more data circle 368 on Postpaid Card

For best results
in Surface Grinding . . .
Always Use Blanchard Wheels!

The flexibility in application of your Blanchard Surface Grinder enables you to attain peak production at lowest cost on hundreds of different grinding jobs. *But, it is very important that you use the right wheel for each job!*

Blanchard makes and stocks a great variety of silicate, resinoid and vitrified bonded wheels and segments. Ask your Blanchard representative to help you select the wheel — or wheels — best suited to your requirements. Call or write him today. And may we send you a copy of "The Art of Blanchard Surface Grinding" (4th Edition)?

THE BLANCHARD MACHINE COMPANY
64 State Street,
Cambridge 39, Mass., U. S. A.



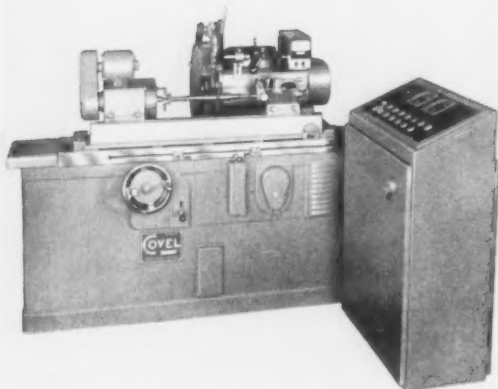
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YOU'LL SEE THESE AT BOOTH 332

NEW

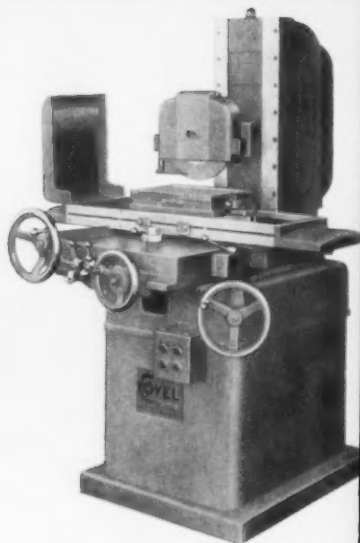


CONTRIBUTION



NEW Cylindrical Grinder has
AUTOMATIC SIZING AND CYCLING
—ELECTRONICALLY CONTROLLED

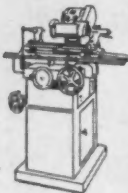
See this machine grind parts to .000050" accuracy. Its electronic system controls all functions from start to finish. Bearings of its patented super-precision spindle are automatically loaded.



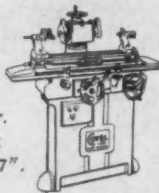
NEW Surface Grinder is
LOW-COST HIGH SPEED HYDRAULIC

See high speed precision grinding of dies. 12" grinding wheel and 2 HP direct motor driven spindle. Hard chrome tableways and many other features for long-lived micro-precision performance.

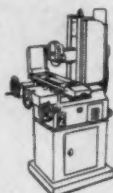
No. 6A
Universal
Cutter and
Tool Grinder.
Swings work
8" dia. x 16".



No. 12A
Universal
Cutter and
Tool Grinder.
Swings work
10" dia. x 27".



No. 7A
Hand Feed
Surface
Grinder,
6" x 12".

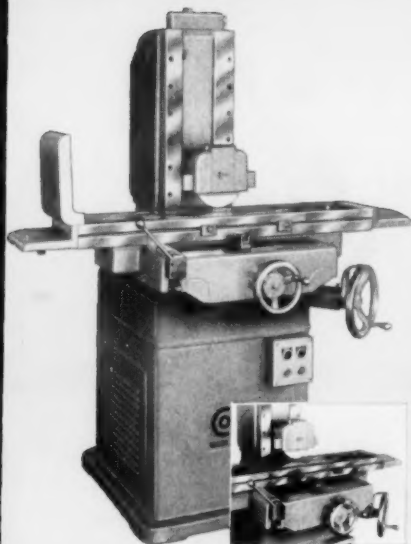


No. 80
Hydraulic
Surface
Grinder,
16" x 3

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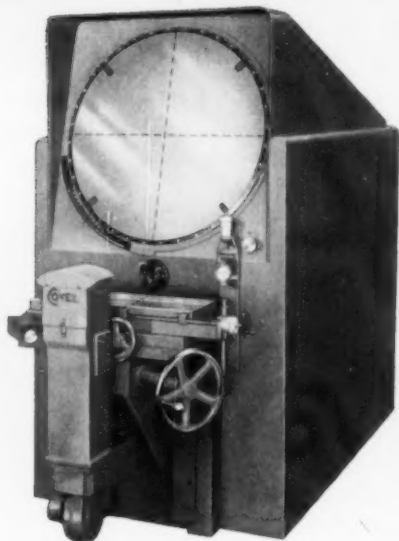
Machine Tool Exposition, Chicago, September 6-16

TO PRODUCTION EFFICIENCY



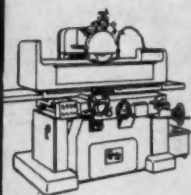
NEW Surface Grinder with POWER-ASSIST HAND FEED

See and operate this revolutionary new hand feed that permits table speed and direction to be controlled exactly as you want them with the effortless ease of power steering.



NEW Optical Comparator has THIRTY-INCH SCREEN

Five-lens turret. Relay lens system gives upright image of part being inspected. Convenient front-of-machine operation. Stage capacity 8" x 8", has micrometer measurement.



Micro-Precision a Covell Tradition—Since 1874

COVEL

PRECISION GRINDERS

BENTON HARBOR, MICHIGAN

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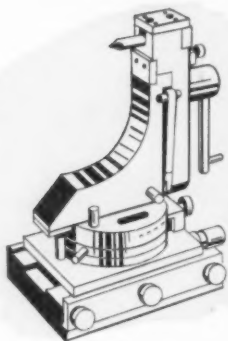


You get day - in²
with J & S

4. WHEEL DRESSERS

Hardened, ground & lapped. .0001" accuracy. Forms wheels to shape on surface grinders, tool and cutter grinders, cylindrical grinders.

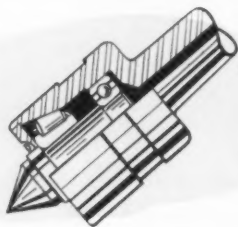
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5. CENTERS

the only guaranteed self-adjusting live centers. Accuracy better than .0001". Greatest selection of "standard" and "special" live centers.

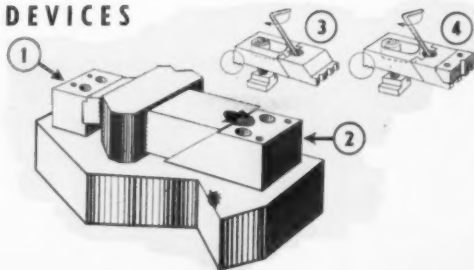
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6. DOWN-HOLDING DEVICES

secure workpieces quickly and rigidly, for all needs.

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day - out economy precision - crafted products

J & S FLUIDMOTION Wheel Dressers

dress tangent in one continuous motion—two angles tangent to concave or convex radii—concave radius of 180°. Simple dressing of complex forms with .0001" accuracy for all types of surface and cylindrical grinders. Also new compound micrometer wheel guard adapts Model F in an inverted position on surface and visual grinders.

Complete Line of Precision-Built Live Centers

featuring one-year guarantee, self-adjusting bearing take-up, RPM speeds to meet capacity of modern machines, correct capacity ratings, hardened and ground throughout. Plus expansion compensators and divided thrust for maximum load.

Down-holding Devices for Any Requirement

famous for faster set-ups, stronger grip, less obstruction. Shown at left are: 1. Counter clamp, 2. Fixture clamp, 3. Standard Lo-Grip and 4. Standard Hi-Grip jaw clamps.

Literature and data on request.

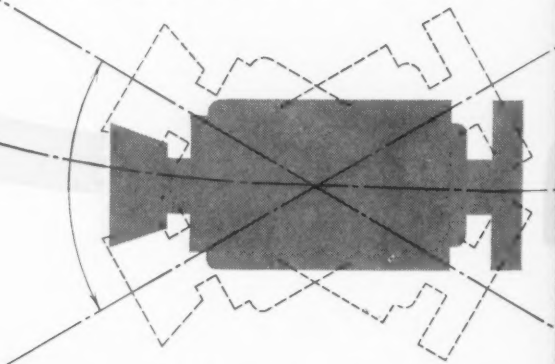
Specify product No. listed opposite illustration.

J & S TOOL CO., INC.

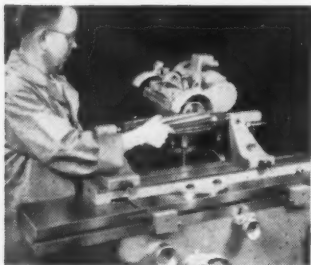
871 DORSA AVE., LIVINGSTON, N. J.

WYman 2-3181

The wheel head TILTS 30°!.....



The NEW NORTON No. 200 Cutter and Tool Grinder makes setups simpler... easier... quicker!

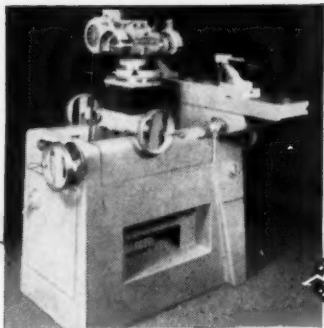


Tool room men can tell you that grinding a taper reamer is one of their toughest jobs. But now they're discovering that it and other tough tool grinding jobs are a "snap" with the new Norton No. 200. Because:

You can tilt the wheel head up to 15° above or below horizontal — and swivel it through a full orbit of 360°.

And the table has a very rugged, extremely accurate guide bar, which assures precision in tracking, during the most difficult grinding jobs.

All this means no more time-wasting "cut and try" tactics... no more wrestling with tricky setups... a wheel head scale provides quick direct readings of clearance angles... for practically all grinding on centers, the



ORBITS 360°!

tooth rest can be kept on the center-line of the cutter, eliminating time losses from additional settings . . . the table design enables use of gage blocks for quick taper grinding setups and fast return of table to straight setting . . . greater wheel head capacity through eccentric mounting simplifies approach to many special jobs.

In addition:

The No. 200's extremely solid grinding action brings you excellent finish on tool cutting edges, with resulting benefits in tool life and performance. That's because the No. 200 is a wheel slide type machine, where grinding is always within the area of the rigid base, with no instability due to work overhang. Other advanced features include: quick-change two-speed wheel drive; centrally located column controls, wheel slide dials readable from any position.

VISIT BOOTH #651

Machine Tool Exposition • 1960

INTERNATIONAL AMPITHEATRE

Chicago — September 6-16

Your Norton Man, a trained grinding engineer, will be glad to show you how the new Norton No. 200 cutter and tool grinder can help you modernize and economize in your plant. For catalog #1371, write to **NORTON COMPANY**, Machine Division, Worcester 6, Mass. *District Offices:* Worcester, Hartford, Cleveland, Chicago, Detroit. *In Canada:* J. H. Ryder Machinery Co., Ltd., Toronto 5.



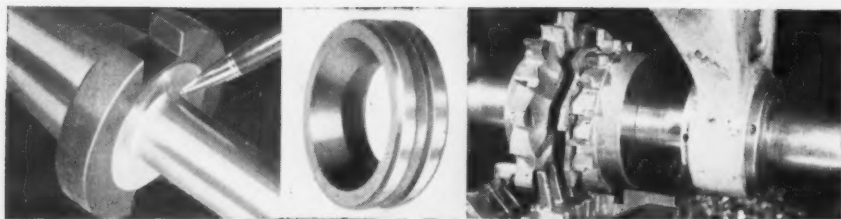
75 years of . . . Making better products
... to make your products better

MACHINE TOOL DIVISION: Grinding and Lapping Machines — **S & E DIVISION:** Shapers — Gear Cutting Machines — Gear Induction Hardeners

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August, 1960

MODERN MACHINE SHOP 75



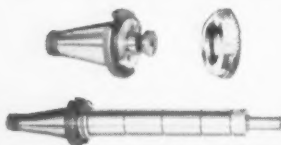
improve setup accuracy, cutter life

...with Scully-Jones milling arbors—large end bearing and oversized end collar give you a perfect fit and added protection against runout when spacers and cutters are "snubbed up." New 45° chamfer in end collar leaves plenty of clearance over the fillet. Larger size makes it easy for operator to identify end collar—prevents mistakes when setting up. More accurate setups mean each tooth in the cutter takes its share of the load. Larger 3/16" radius between arbor body and shaft eliminates

stress points, reduces possibility of breakage under heavy loads. S-J shell end mill arbors increase accuracy, too, because taper is held within .0002", with 10-20 microinch finish. Call your Scully-Jones representative or distributor for service on arbors, solid and adjustable spacing collars, shell end mill arbors, and precision sleeves. Look in the Yellow Pages, or phone us—Bishop 7-5900.

Scully-Jones and Company

1909 S. ROCKWELL ST., CHICAGO 6, ILLINOIS



**SCULLY
JONES** **MILLING
ARBORS**

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NOW 7* STANDARD LAPMASTERS

FOR PRECISION LAPPING

to a flatness of .0000116" or less with a micro-inch finish of 2 to 3 RMS. All Lapmasters will maintain this uniform accuracy piece-after-piece because conditioning rings continually condition the lap plate during entire lapping cycle.

IN SMALL LOTS OR THOUSANDS PER DAY

with consistent accuracy. Production is not interrupted or slowed down for replacing or reconditioning lap plates.

OF PARTS UP TO 32" DIA.

and as small as 1/8" dia. Accurately laps paper-thin pieces as well as giant two-ton parts.

OF ANY SHAPE, FORM OR MATERIAL

tall or squat, long or short, flat or odd shaped... any metal, ceramics or plastic all at the same time if necessary. Inexpensive work holders eliminate danger of stresses and warping usually caused by clamping during grinding or milling.

**For your special lapping requirements, we will build Lapmasters any size.*



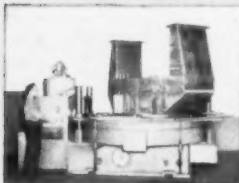
MODEL 10 for maintenance lapping of parts up to 3-11/16" dia.



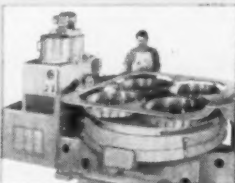
MODEL 12 for parts up to 4" dia.



MODEL 24 for parts up to 9 1/2" dia.



MODEL 84 for parts up to 32" dia.



MODEL 73 for parts up to 27" dia.



MODEL 36 for parts up to 14 1/2" dia.

WRITE FOR THE COMPLETE
LAPMASTER STORY
Write for bulletins describing
the Lapmaster line and
chart on measuring flatness.



MODEL 48 for parts up to 17" dia.

Lapmaster
... THE
MACHINE THAT PUT
PRECISION LAPPING ON A
PRODUCTION BASIS

A product of

Crane Packing Company

6418 OAKTON STREET • MORTON GROVE, ILLINOIS (Chicago Suburb)

In Canada: Crane Packing Company, Ltd., Hamilton, Ont.

For more data circle 377 on Postpaid Card



MUCH MORE - for LESS !

with *Cleveland* **ROUGHNESS METER**

The Roughness Meter was designed to do more than any other surface measurement instrument at a price within the range of any budget.

More VERSATILE—with less equipment you can measure the widest range of surface shapes—outside diameters down to .030"—inside diameters as low as .25".

More ACCURATE—less arguments. Precision calibration and construction exceeds all military and industrial standards.

More VALUE—lower cost. You will save from 35% to 100% over the cost of comparable equipment.

More CONVENIENCE—less confusion. The easiest to operate. Clearly marked controls, skids, adjustable tolerance hands.

other CLEVELAND PRECISION INSTRUMENTS

INDI-AC—Ultra-Precision
Electronic Height Gage

•
MICRO-AC—Electronic
Micro-Comparator

•
PAR-AC—Electronic
Production Gage

•
INDI-RON—Ultra-Precision
Roundness, Squareness and
Concentricity Gage

•
INDI-AC Jr.—General
purpose precision gage.
Battery and AC operated.

•
Write for Free Wall Charts
"Sources of Measurement Error"

Cleveland INSTRUMENT COMPANY

SUB. THE BENDIX CORPORATION

6220 East Schaaf Road

Cleveland 31, Ohio

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2 1/2"
SHANK

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END MILLS and HOLDERS

Rugged
Dependability
for your
Toughest Jobs



A complete line...

- 2 1/2" diameter shanks
- 3" diameter of cut
- 12" length of cut

OVER
40 YEARS
OF LEADERSHIP
SINCE 1918

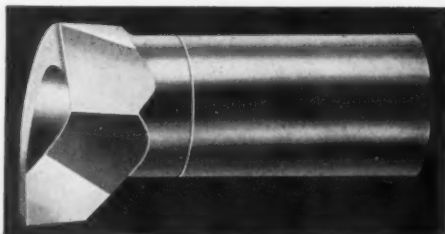
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THE WELDON TOOL COMPANY

3000 Woodhill Road • Cleveland 4, Ohio

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check CRITERION for boring tools



BORING TOOLS

Complete range of sizes.
Boring tools in both High Speed and Carbide to enter holes from 1/16" dia. to 2".
Criterion design permits 20% greater tool life.
Styles include tools for general boring or bottoming and facing.
Also available in extra long shank lengths.

THREADING TOOLS

Internal Threading Tools in both High Speed and Carbide to enter holes from 1/16" to 2" diameter.
True thread form remains for life of tool.
Top face grinding, only, is required to resharpen.
Available in both standard and extra long shank lengths.

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Retaining Ring and "O" Ring Grooving Tools in High Speed only, available in all standard sizes.
These are ground to exact specifications as adopted by the National Aircraft Standards Committee, U.S. Army and Navy Ordnance and leading industrial concerns.

See these tools at
your local dealer or
write for literature.



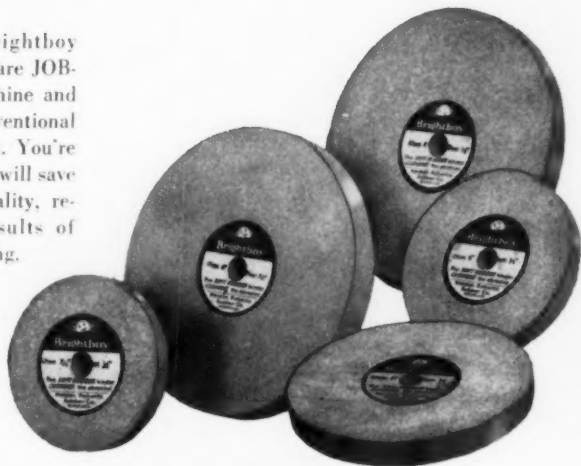
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MACHINE WORKS
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COSTA MESA, CALIFORNIA

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**The Revolutionary New Concept
of Abrasive Applications!**

MULTI-USE, SOFT RUBBER BONDED ABRASIVES THE ONLY COMPLETE, COMPREHENSIVE STOCK LINE!

49 readily available Brightboy STOCK grains & textures are JOB-MATCHED for your machine and manual operations, for conventional and automation production. You're sure to find the grades that will save time, improve product quality, reveal the exceptional results of abrasive-and-rubber finishing.



YOU NEED BRIGHTBOY . . .

Brightboy's unique *abrasive-and-rubber action* simultaneously **BURRS, CLEANS, FINISHES, POLISHES.** Frequently bridges the gap between the grind and buff in one operation.



regardless of your type of production. Write for the new Brightboy catalog which lists all grains, textures, machine speeds, new and revised wheel sizes, center hole specifications conforming to American Standards safety regulations.



**BRIGHTBOY INDUSTRIAL DIVISION
WELDON ROBERTS RUBBER CO.**

95 North 13th Street

Newark 7, N. J.

America's Pioneer Manufacturer of Rubber-Bonded Abrasives

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channel milling at Ingersoll-Rand

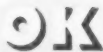
Patented Post, N.Y.



Performance:

With one pass, the cutter takes the full depth of $2\frac{3}{4}$ " cut at 15 rpm, 64 surface feet per minute. *Objective and Operation* — Get the metal out in the fastest, cheapest way possible. A job for a modern milling machine. *Workpiece* — Drop forged steel master connecting rods for stationary SVG gas compressors, widely used in oil field work to re-pressure wells, pipelines, and so forth. *Cutting Tool* — A 16-inch O K alternate angle or staggered tooth milling cutter with high speed steel blades set at the correct axial and radial rake to give a shearing action and free chip flow. O K tapered and serrated blades combine maximum strength with ease of replacement and adjustment for wear. † This is just one of hundreds of metal removing operations successfully performed with O K cutters at Ingersoll-Rand plants.

Write for Catalog 13 FREE. THE O K TOOL COMPANY, INC.
800 ELM STREET, MILFORD, NEW HAMPSHIRE



modern milling



cutters for



modern



milling machines

For more data circle 382 on Postpaid Card

For fast, easy precision angular set-ups . . . **Magna-Lock SINE CHUCKS and PLATES**

ELECTRO-MAGNETIC TYPE

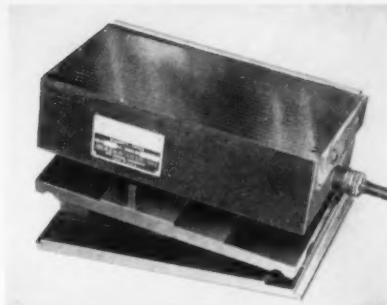
Exclusive laminated top plate. Circular locking take-up on hinge rolls for continuous accuracy. All-steel, moisture-proof. Uniformly distributed holding power.

PERMANENT MAGNET TYPE

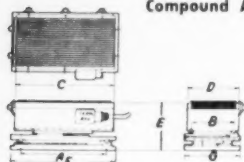
Low height, light weight, positive holding power.

HARDENED STEEL SINE PLATES

Completely stabilized. Circular locking take-up. Tapped holes for clamping work.

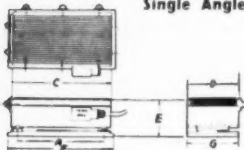


Compound Angle Sine Chuck



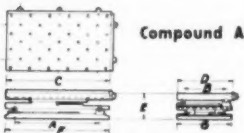
MODEL	(SINE) A	(SINE) B	C	D	E	F	G	PRICE
ELECTRO-MAGNETIC								
DA-5	5.000	5.000	6 1/2	6	5 1/4	7 1/4	6 1/2	\$ 445.00
DA-10	10.000	5.000	11 1/2	6	5 3/4	12 1/4	6 1/2	590.00
DA-1010	10.000	10.000	11 1/2	10	5 3/4	12 1/4	10 1/2	1,180.00
DA-20	20.000	5.000	21 1/2	6	5 3/4	22 1/4	6 1/2	1,400.00
PERMANENT MAGNET								
DP-5	5.000	5.000	6	6	5 1/4	7 1/4	6 1/2	445.00
DP-10	10.000	5.000	12	6	5 3/4	12 1/4	6 1/2	590.00

Single Angle Sine Chuck



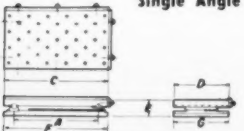
MODEL	(SINE) A	C	D	E	F	G	PRICE
ELECTRO-MAGNETIC							
SA-5	5.000	6 1/2	6	4 1/2	7 1/4	6 1/2	\$310.00
SA-10	10.000	11 1/2	6	4 1/2	12 1/4	6 1/2	390.00
SA-1010	10.000	11 1/2	10	4 1/2	12 1/4	10 1/2	775.00
SA-20	20.000	21 1/2	6	4 1/2	22 1/4	6 1/2	950.00
PERMANENT MAGNET							
SP-5	5.000	6	6	3 1/2	7 1/4	6 1/2	310.00
SP-10	10.000	12	6	3 1/2	12 1/4	6 1/2	390.00

Compound Angle Sine Plate



MODEL	(SINE) A	(SINE) B	C	D	E	F	G	PRICE
DA-5P	5.000	5.000	6 1/2	6 1/2	3 3/4	7 1/4	6 1/2	\$ 430.00
DA-10P	10.000	5.000	11 1/2	6 1/2	3 3/4	12 1/4	6 1/2	565.00
DA-1010P	10.000	10.000	11 1/2	11	3 3/4	12 1/4	11	1,050.00
DA-20P	20.000	5.000	21 1/2	6 1/2	3 3/4	22 1/4	10 1/2	1,350.00

Single Angle Sine Plate



MODEL	(SINE) A	C	D	E	F	G	PRICE
SA-5P	5.000	6 1/2	6 1/2	2 1/4	7 1/4	6 1/2	\$280.00
SA-10P	10.000	11 1/2	6 1/2	2 1/4	7 1/4	6 1/2	380.00
SA-1010P	10.000	11 1/2	11	2 1/4	12 1/4	11	750.00
SA-20P	20.000	21 1/2	6 1/2	2 1/4	22 1/4	6 1/2	920.00

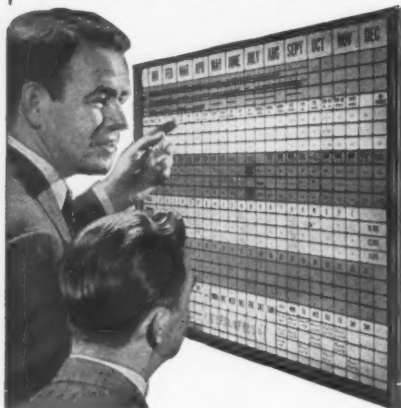
Order now for prompt delivery

MAGNA-LOCK, INCORPORATED

BIG RAPIDS, MICHIGAN, U.S.A.

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modern machine shop

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Duncan W. Barton, 60 E. 42nd St., New York 17, N. Y., Murray Hill 7-7390. Eastern Pennsylvania, Central New York State, New Jersey, Maryland, Delaware, Washington, D. C., Long Island, Brooklyn.

Granville M. Fillmore, Vice President, 60 E. 42nd St., New York 17, N. Y., Murray Hill 7-7390. Eastern New York State, Connecticut, Massachusetts, Rhode Island, Vermont, New Hampshire, Maine.

John M. Krings, Vice President, Room 211-A, 540 N. Michigan Ave., Chicago 11, Illinois, Delaware 7-5441. Western Michigan, Illinois, Wisconsin, Iowa, Minnesota, the Dakotas, Northern Indiana.

George E. Hay, 431 Main St., Cincinnati 2, Ohio, CHerry 1-5924. Western Pennsylvania, Western New York, Ohio, Kentucky, Southern Indiana.

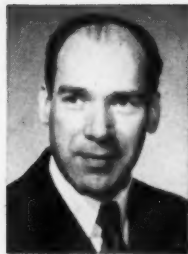
Jeryl L. Marlatt, 1051 Brooklawn Rd., Birmingham, Mich., Midwest 6-5935. Eastern Michigan, Northwestern Ohio.

Norman S. Rogers, 431 Main Street, Cincinnati 2, Ohio, CHerry 1-5924. Central Indiana.

The Robert W. Walker Company, 730 South Western Ave., Los Angeles 5, Calif., DUnkirk 7-4388, 57 Post St., San Francisco 4, Calif., SUTter 1-5568. California, Oregon, Washington.

★ ★ ★ ★

**Circulation over 54,000—
largest in metalworking field**



Fred W. Vogel

Over the Editor's Desk

RECORD YEAR

Since automobile production is still a pretty reliable indicator of business activity it may be well to pause at this time and check the figures. The automotive industry is now predicting that 1960 sales of cars made in the U. S. will total 6.1 million, making this the second best year in history, second only to the year 1955. In that year, Americans bought 7,169,908 cars, including 54,465 imports. This year, imports are expected to total around 500,000. Sales of all new cars, domestic and foreign, will be in the neighborhood of 6.6 million.

Looking toward the new models which are expected to begin moving into the showrooms a bit earlier than in previous years, it is generally believed that the 1961 models will be slightly higher in price, due to the continued increase in the car makers' costs.

★ ★ ★ modern machine shop ★ ★ ★

GROWTH

What makes America grow that's different from Russia? Economists say that it is self interest—the self interest of people—in final analysis, the self interest of the individual.

Growth rests on our hopes for a better future, a brighter tomorrow, and on our optimism that we can make these hopes come true. So we put money in banks. We invest. Instead of using money right away, we save. Business does the same thing. Because by saving and investing we hope to build a future and meet future needs.

The results of all this savings and investing we can see in our own community. The results show up when a new plant is built, an office building goes up, or a shopping center appears. The results let people live better and work better. The total result—the most prosperous nation in the world.

Over the Editor's Desk . . .

WE MISSED A FEW

A very careful check and double-check of the HONOR ROLL list which appeared in the June issue apparently was not enough for since we came off the press with that issue we have been reminded by phone calls and letters of the several names which we failed to include on the list. Our intention in publishing the list was to call attention to the many very loyal supporters of MODERN MACHINE SHOP who, through good times and bad, have continued to place their advertisements in our publication each year for a period of five consecutive years or longer.

We regret the omission of the names listed below—business establishments whose encouragement and support helped to make the publishing of MODERN MACHINE SHOP possible and most deservedly should have been included on the HONOR ROLL.

1936

Watts Bros. Tool Works

1940

Torit Manufacturing Company

1951

Hy-Pro Tool Company

1952

Collis Company

1953

Burr and Son, Inc., J. T.

1954

Defiance Machine and Tool Company

Porter Machine Company

Tapmatic Corporation

1955

Ace Drill

1956

Allennair Corporation

Capewell Manufacturing Company

Cleveland Automatic Machine Company

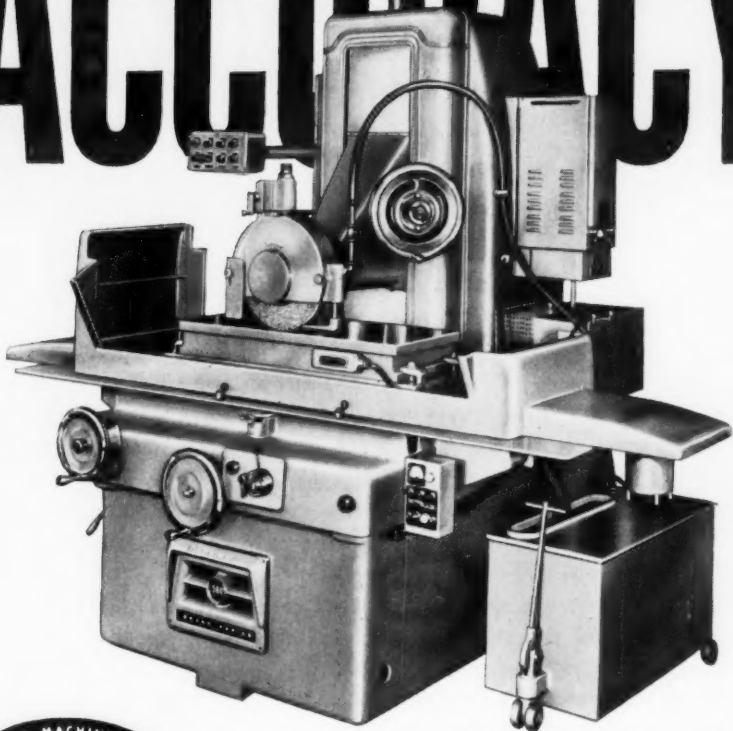
Coolant Equipment Corporation

★ ★ ★ modern machine shop ★ ★ ★

NEXT MONTH

From all reports and from all the descriptions of the new equipment and tools that have been coming across our desk in recent days it is becoming quite apparent that the displays and exhibits in Chicago next month will be the finest ever made available for viewing by metalworking executives. Everyone who can arrange to go to Chicago will profit many fold for the time and money spent for the trip. For those who may not attend, we would like to assure them that the September issue of Modern Machine Shop will be as complete with information on the equipment displayed as we can make it. Be sure to carefully go through your copy when it reaches you.

ACCURACY



Booth 751
The Machine Tool Exposition



... to millionths of an inch

Accuracy that's a must for tool rooms . . . so fine it can be measured only by a light bounce, so precise it produces micro-inch finishes at production speeds. This is the accuracy you get in the No. 560 Grand Rapids Precision Tool Room Type Hydraulic Feed Surface Grinder . . . accuracy assured by such features as hand-scraped V-shaped ways, rigid one-piece column and base casting, truly automatic cross feed and extra-heavy spindle. Why settle for less?

For information on the No. 560 or the Nos. 550, 360 and 350 Tool Room Type Surface Grinders, send a note on your letterhead.

GALLMEYER & LIVINGSTON COMPANY

408 Straight Ave., S.W. • Grand Rapids, Michigan.

For more data circle 385 on Postpaid Card



Report from Washington

on Events Which May Affect You and Your Job

• **PRICES OF MACHINERY WILL HOLD STEADY** during the next 12 months or so. A few types will go up but they'll be offset by declines in some other items. Costs of machinery makers will be rising because of higher wage rates, but excess capacity, higher imports and leveling business will hold down prices. Here's the price outlook for the major kinds of machinery: Farm equipment, which has risen 1.5% in the past year, will hold steady. With farm income dropping, demand will fall. Electrical machinery will probably drop 1% in price, as the result of easing of demand and the pressure from imports. Construction machinery will increase by another 1% or so in the coming year. (Equipment prices rose 3.5% during the past year.) A rise in road-building this Summer will help. Machine tools have edged up a little this year, but they'll be steady for a while. Poor demand and imports are hurting. General purpose items—elevators, pumps, material-handling equipment, etc.—will move up by less than 1% on the average within the next few months. Then, prices will level off.

• **THE BUSINESS OUTLOOK IS SOMEWHAT CLOUDIER** than it was a month ago. Most economists still think that activity will keep on rising slowly in the second half. But even the optimists have some doubts. It's not that signs of softness are increasing. Rather, the strength that was expected hasn't quite materialized. June's sluggish business has made this point clear. Consumer spending is still the key to the second-half trend, though even it has a rather lackluster outlook. Employment will climb only seasonally, and hours of work are not rising. So consumer incomes—and buying—will go up only moderately. Strength elsewhere in the economy leaves a lot to be desired. Capital spending will rise slowly. (The expected 1960 gains came early.) Home-building activity will pick up, but not until late this Fall.

Inventory accumulation, now falling, will turn about slowly. Government spending will rise little. If businessmen become nervous, even these gains might vanish. Here's what a majority of economists see in the last half: Industrial output will increase 2% to 3% to a new record. Housing starts will go up 100,000, to a 1.3 million-rate. Auto sales will be as good as the Spring's—but no better. Appliance sales will rise 3% to 5%, as housing expands. Unemployment will jump as new workers fail to find jobs.

- **BUSINESS ABROAD IS NOW SLOWING DOWN**, just as it is in this country. But the causes of the leveling aren't always the same as those in the U.S. Europe's boom, for example, is losing momentum because of lack of capacity. The labor force is fully employed. Tight money is hampering expansion. In West Europe, industrial output rose only 2% last Winter, as compared to a rate double that in the previous three months. West German production is now leveling off, after a long rise. French output is actually falling. The trend of business in Canada, though, is following ours. Economists have given up hope of a 1960 boom. The output of factories is on a plateau, while unemployment is on the rise. Money is easing up North, too, just as it is in this country. The one big bright spot is the improvement in foreign trade.

- **CREDIT WILL CONTINUE TO EASE IN COMING MONTHS**, say monetary experts. But it won't be because of any new action Washington is currently planning. The Federal Reserve wants to remain neutral till a year-end trend is clear. Rather, the easing will flow from slowly lessening demands from borrowers. Short-term interest rates, which have been declining for much of the year, are expected to slip more by year-end. Long-term rates—mortgages, bonds—will fall more slowly. Mortgage lenders will be asking for smaller discounts.

- **WAGE HIKES IN THE SECOND HALF** will average about 8½¢ to 9¢ an hour. The pattern that has held so far in 1960 will rule in the last six months. Of course, there'll be some gains much bigger, offset by smaller ones, too. Unions will be getting some additional fringe benefits, which will increase the over-all costs to employers; but the business slowing will limit these. Fattest increases in wages will be won in construction, which will push the nonmanufacturing figure above 10¢. Smaller hikes will show up in railroads—5½¢ plus—and in textiles, aircraft, airlines, and telephone companies. In addition, there will be boosts of 10¢ or more in rubber, reflecting regular wage increases, plus cost of living extras.

Report from Washington . . .

- **GET SET FOR A REALLY ROUGH CAMPAIGN** FOR the White House this Summer and Fall. Political experts predict that it will be the roughest in decades. For one thing, both Nixon and Kennedy are young and ambitious. And they are tough campaigners. Another reason for roughness is the fact that the big issue will be foreign policy. Tempers are already frayed over the Summit blow-up and riots in Japan. Democrats are certain to make much of the handling of the U-2 incident. There's no big gap between the foreign policies of the parties. So the fight may have nowhere to go but to personalities.

- **THE DEMOCRATS ARE CERTAIN TO RETAIN THE SENATE** in the coming session. They hold 65 of the 100 seats now. And only some of them are up for contest. Few of these are shaky—perhaps one each in Montana, Wyoming, and Michigan. On the other hand, the Democrats anticipate winning some additional elections. They are drawing beads on several—in Iowa, Colorado, Kansas, and in Nebraska. The House may be another story. All seats there are up for election. In a landslide, the GOP standard-bearer could sweep in a majority with him. Most experts don't expect the GOP to carry the House. But it could make some big gains.

- **THREE NEW GOVERNMENT BOOKLETS** which you may find to be helpful in your business are available for little or nothing from various federal agencies. "Small Business Pools for Defense" tells how to join with other firms to get orders from the government. It's free from the Small Business Administration, Washington 25, D. C. A guide to promotional allowances that are legal—or illegal—under the antitrust laws can also be obtained at no charge from the Federal Trade Commission (Washington 25, D. C.). County-by-county business data is available from the Census Bureau: "General statistics for Counties, 1958 Census of Manufacturers." It costs 50¢ from Census, Washington 25.

- **GASOLINE PRICE WARS ARE LIKELY THIS YEAR** in some parts of the country. Inventories of gasoline are large and crude oil output is still above needs. Demand for gasoline through September will be 2.5% above that of a year ago; but an increase of 5% had been expected. Motorists are not driving as much as in past years and the rising number of small cars is cutting into sales. So, price cutting will erupt as refineries try to clear their big gas stocks.

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As I See Your Supervisory Problems

By **ALFRED M. COOPER**
Consulting Editor, Modern Machine Shop

As any competent foreman or office supervisor knows there are almost no justifiable limits that may be placed on a head man's responsibilities. Yet sometimes the comment is heard: What on earth has *that* to do with supervision?

To the one who asks this question the subject under consideration has no conceivable bearing on intelligent handling of subordinates. But the more you study this subject the less you are inclined to set up specific limitations. Certainly the subject is as wide as any consideration of human-relation problems. Perhaps the only legitimate proscription here is: never engage in interference with the human rights and liberties of subordinates.

Fortunately, most supervisors have had experience as workmen before attaining to supervisory rank, and therefore instinctively sense the subordinate's feelings in these matters. Wherever such limitation of a supervisor's authority exists it is imposed by someone who has never been employed as a workman.

Every survey that has been made to determine the attitude of the worker toward his company and his management emphasizes the fact that this attitude is based first of all on the relationship of the worker and his immediate supervisor. This relationship, as of today, is more important than anything to do with wages or working conditions. There was a time when this was not true, but that was back in the days when wages were low and working conditions were terrible, particularly as regards safety factors.

But today it is true that the supervisor-subordinate relationship determines in many instances whether or not labor strife will be rampant in a particular plant or department. Every supervisor is aware of his responsibility here,

For answers to your perplexing managerial problems address your letters to Mr. Alfred M. Cooper, MODERN MACHINE SHOP, 431 Main St., Cincinnati 2, Ohio.

NOBODY SAID

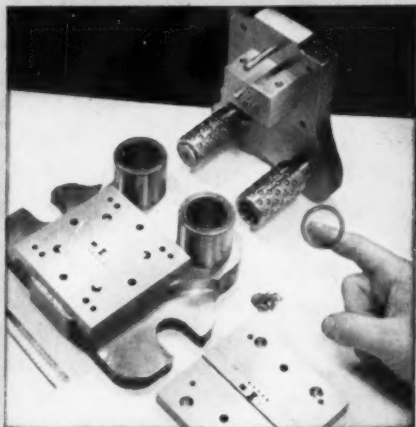
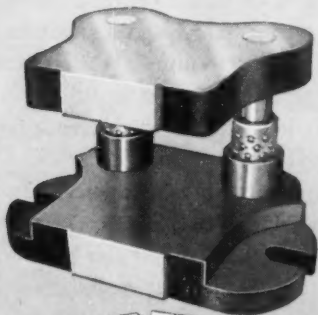
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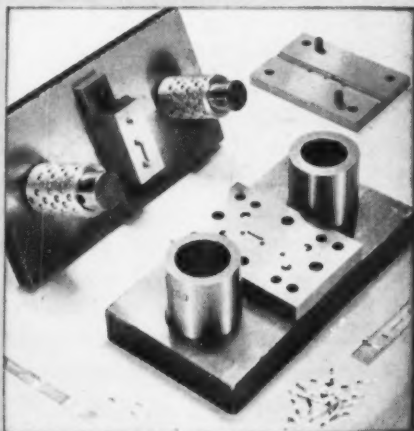
To the best of our knowledge, Lempeco is the only 2-post STOCK* die set which could produce this electronics part from .001" thick high nickel alloy material—with punched holes of .001" diameter. This die, mounted in a standard Lempeco STOCK* die set, produced 30,000 burr-free parts on its initial run.

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Supervisory Problems . . .

and every executive knows that so long as the supervisor's authority has been in no way abridged, the plant's labor relations depend largely on what the supervisor does or does not do.

Occasionally we encounter a supervisor who believes it is essential to be a bit stand-offish with his subordinates and you may be sure that these people sense this fact and will refuse to discuss anything regarding their personal problems with such a supervisor. In such case the supervisor is building resentment toward himself and his company. There is inherent in the true supervisor-worker relationship a necessity that the head man may be consulted on any number of matters not directly connected with the job itself.

Again, a supervisor may not be at all stand-offish, but rather too intimate in his dealings with those reporting to him. This attitude also creates resentment, since such a boss may well interfere with the private affairs of a worker to the extent that he becomes a nuisance.

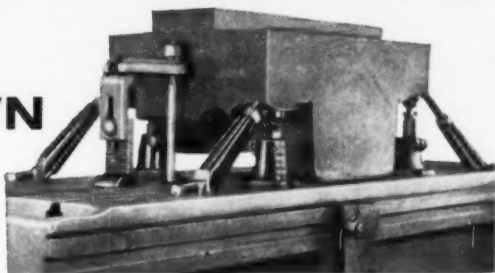
A third situation that leads to trouble occurs when the authority of the supervisor has been for some reason undermined and it is thus an impossibility for him to carry out all his legitimate responsibilities in the manner he knows they should be dealt with. In such rudimentary matters as having the final word in hiring and firing, and in having his recommendations for promotion given careful weight, there may develop an unfortunate situation in which his opinions in these matters are given secondary consideration. Whenever this happens the workers soon appreciate that their immediate supervisor's decisions may readily be set aside. Nothing could more quickly upset the morale of a workforce than such a practice.

This is true, since the essence of supervision is based on responsibility and authority and no one but the immediate head man is in a position to pass intelligently on such matters as these. If it is determined that he is *not* so qualified, then he should be replaced. But this action must never be taken until he has been given a free hand to run his job without interference from anyone who contacts his subordinates but rarely.

The essentiality of maintaining the proper supervisor-employee relationship becomes apparent in time of labor strife. It also becomes even more obvious in the even greater affairs relating to the preservation of our American way of life. For it should be apparent to the most casual observer that a group of disgruntled employees may register their disapproval of any political candidate quite successfully in any democracy in which majority vote decides the issue.

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Finish Machining



General view of the huge three-spindle Cincinnati Hydrotel milling machine, showing the vertical 6 by 20-foot machine bed and the operator on his adjustable-height platform.

Critical Parts Prior to Heat Treatment

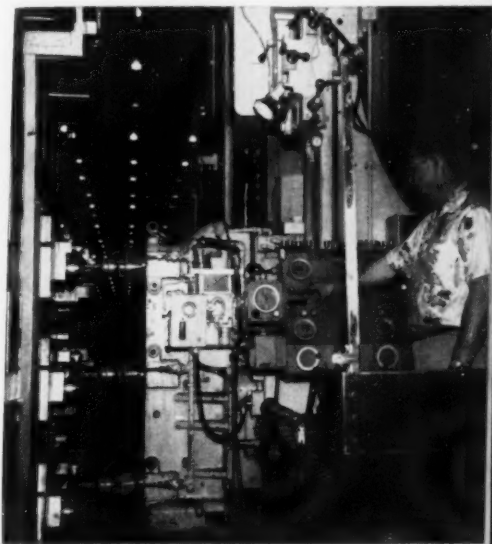
The relatively high drawing temperature of a metal alloy is being exploited to finish machine aircraft fittings before heat treating.

By GILBERT C. CLOSE
Field Editor, Modern Machine Shop

In many cases a peculiar metallurgical property of a metal alloy can be used to advantage during production. This is happening right now at the Long Beach, California Division of Douglas Aircraft Company, where the relatively high drawing temperature (925 deg. F.) of 4340 chrome-nickel molybdenum steel is being exploited to finish machine a critical part prior to heat treatment.

The part in question is a main landing gear attach fitting for the huge new Douglas DC-8 jet transport airplane. During the rough and finish machining cycles prior to heat treatment, the part is allowed to warp as it will so long as the required dimensional tolerances are maintained. Then, after hardening and slight tempering heat treatments, the part is forced into a critically tooled heat treat fixture for a 12 hour draw at 925 deg. F. This high temperature draw

softens the metal sufficiently so that the part conforms exactly to the fixture in which it is mounted, and takes a permanent set. Thus, when it is removed from the drawing fur-



Close-up of machine control panel. The three spindles of the machine are visible at left.

"... three parts can be milled at one time."



Close-up of main landing gear attach fittings for DC-8 jet transport which are completely finish machined prior to heat treatment. Parts are of 4340 chrome-nickel molybdenum steel.

nace, the part is not only finish machined, but is critically straight in all dimensions.

Mr. Robinson, facilities engineer in charge of this machining project, points out that substantial savings are realized by finish machining prior to heat treatment. "We did have to invest some extra money in the drawing fixture," Robinson says, "but in doing this we saved all the costs of a finish machining operation after heat treatment of the part. This includes set-up time, a finish machining fixture, and the carbide cutting tools that would be necessary in order to finish machine the part in the hard condition."

The entire production program on this main landing gear attach fitting is so well tooled and so well integrated that it presents an almost classical example of space-age production at its best. In it lies many seeds for

thought in the development of similar types of high efficiency production programs.

The machine used to mill the parts is a specially built Cincinnati Hydrotel with a traveling column which contains three horizontal spindles that are gang controlled by an electro-hydraulic tracer installation. Thus, three parts can be milled at one time. The tracer stylus, acting against the pattern, imparts electrical impulses to an amplifier. Output from the amplifier, acting through a transducer, operates servo valves which, in turn, meter oil to prime movers. The hydraulics, in turn, control the spindles of the machine through three axes of motion, thus, in effect, providing for three-dimensional machine control.

The huge machine has a 6-foot vertical and 20-foot longitudinal range, thus providing for multiple production of all but the largest parts. Each spindle is driven by 20 h.p. and rotates at about 200 r.p.m. Feed rates used vary between 5 and 8 inches per minute. A conventional water soluble coolant is used for machining operations. Tolerance is held to plus or minus 0.010 inch.

In machining the main landing gear attach fittings three at a time, 100 percent high-speed steel end mills are employed, each spiraled for climb milling. Both rough and finish machining are accomplished in a single set-up. The attach fittings are then removed from the Hydrotel and received their first heat treatment at 1525 deg. F., followed by an oil quench. This first heat treatment leaves the parts so hard that there

"... parts may be stored for weeks without deterioration."

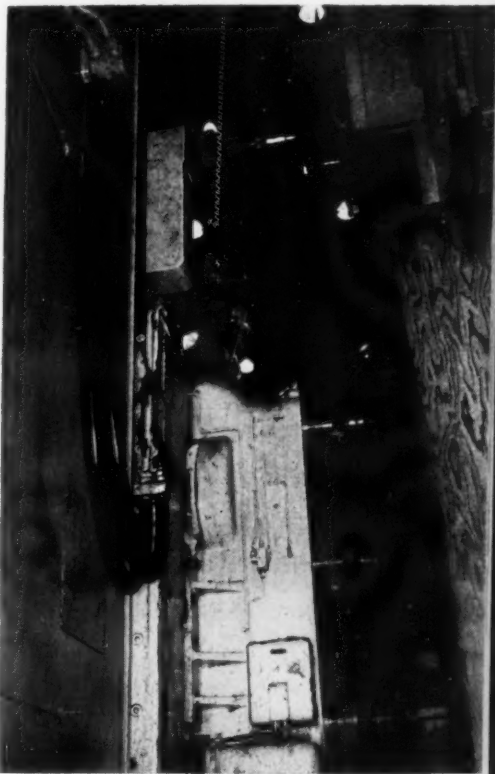
would be a possibility of cracking from internal stresses if they were allowed to set around. To avoid this, the quenched parts are immediately tempered for two hours at a low 400 deg. F. temperature. This temper is just sufficient to remove the harsh hardness "edge" induced by the oil quench, and to relieve internal stresses to a point where any danger of the part cracking is eliminated. In this condition, the parts may be stored for a period of days or weeks without danger of any deterioration whatsoever.

When needed, the parts are then withdrawn for the drawing heat treatment. The copper plating, originally applied to prevent scaling, is stripped. The parts are then forced and wedged into the critically tooled drawing fixtures. During the 12-hour 925 deg. F. drawing soak, the parts conform and set to fixture dimensions, and are ready for installation on the airplane when they are removed from the heat treating furnace.

While in this case the production cycle applies to a single part, it is quite evident that the same cycle of production events could be applied to any part made of a metal alloy with a sufficiently high drawing temperature so that the part would assume fixture configuration during the draw-soak heat treatment. Thus, rough and finish machining could be accomplished on the part prior to heat treatment and in a single set of machine fixtures during a single setup.

Robinson points out that in most cases finish machining a critical part prior to heat treatment, and which

draws at too low a temperature to allow it to conform to draw fixture configuration, would be impractical. Inherent warpage caused by machining, and by the initial heat treatment, would destroy the original dimensions, and the only remedy would be the costly and slow process of straightening in an arbor press, or finish machining in hard condition.



View shows three machine spindles, as well as pattern and tracer (at top). Operator is visible near the center of the illustration.

Process Opens Way to Wider Use of an Alloy Steel

When machine parts of intermediate strength levels or hardness values are required, alternate alloy steel may provide the answer.

By JOHN F. BECK

Metallurgist, The Babcock & Wilcox Company

For proper performance in service, many machine parts are made from selected grades of steel and given precise heat treatments to achieve either high hardness and strength or intermediate properties within a precise range. At the other end of the scale, there are applications where service requirements are not severe and almost any steel with any set of mechanical properties will serve satisfactorily. The area between these extremes has been the object of study by metallurgists of The Babcock & Wilcox Company's Tubular Products Division.

When only intermediate strength levels or hardness values are required, the study showed that economies in time and use of heat treatment equipment can be effected by using an alloy steel with sufficient hardenability to achieve the desired properties by a simple quasi-normalizing treatment. The treatment consists of heating the parts to a temperature range of about 1525 to 1750 degrees Fahrenheit, holding for a few minutes

and cooling in still air. Such an approach can be useful under the conditions mentioned above and especially useful for small shops not equipped for quenching and tempering treatments.

The process offers the additional advantage of producing parts with less distortion and tendency to crack than is usually exhibited by quenched and tempered parts. The only heat treating equipment needed is a furnace capable of reaching temperatures approaching 1750 degrees F. and of a size appropriate for handling the desired parts singly or in batches.

One grade which merits consideration for this type of application and process is AISI E52100. It is an established grade containing nominally 1.0 percent carbon and 1.5 percent chromium. While not normally considered an air hardening steel, it has hardenability enabling it to reach a hardness as-normalized of Rockwell C60 in thin sections. As normally used, in the quenched and tempered condition, it can exhibit

that hardness throughout a section at least one half inch thick. This grade's uniform response to heat treatment and exceptional freedom from non-metallic inclusions have made it especially suitable for use in ball bearings and roller bearings.

Its excellent response to heat treatment makes E52100 attractive for less critical uses than anti-friction bearings. As mentioned, in thin sections it can be normalized to high hardness levels. In heavier sections, normalizing does not obtain such high hardness but will develop hardness higher than is commonly realized—high enough to be useful for many applications. For instance, normalizing a section 0.400 inch thick can

produce a hardness at mid-wall above Rockwell C-40.

The capabilities of E52100 lead to the possibility of significant simplification of practices. To illustrate, in making a sleeve or bushing whose final hardness must be about Rc 35 the usual practice involves machining the part from a medium carbon steel (either carbon or alloy), hardening by quenching in water or oil from perhaps 1550 degrees F., and tempering to about Rc 35. With such a grade as E52100, it would often be possible to simply machine the part and normalize directly to the desired hardness. In most cases that hardness could be approached closely enough by selecting a particular normalizing

Table I—Section Thickness vs. As-Normalized Hardness (E52100*)

Section Thickness (in Inches)	Mid-Wall Hardness (Rockwell C) After Normalizing at Temperature Indicated	
	1550 deg. F.	1750 deg. F.
0.050"	40 Rc	63 Rc
.100	39	62
.150	36	59
.200	35	47
.250	33	45
.300	32	45
.350	32	43
.400	31	42
.450	30	41
.500	29	40
.550	27	41
.600	28	40
.650	27	41
.700	27	40
.750	27	40
.800	26	39

*Heat Chemistry:	C—1.04%, Si—.26%, Cu—.06%	Mn—0.34%, Cr—1.49%,	S—.014%, Ni—.20%,	P—.010%, Mo—.04%,
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Process Opens Way to Wider Use of Alloy Steel . . .

temperature within the range 1525 to 1750 degrees Fahrenheit.

Table I lists the as-normalized hardness for several thicknesses of E52100 rings. They are representa-

tive of only one heat so cannot be considered absolute but will serve as a useful guide. These rings were held in the furnace for one-half hour and cooled in still air at room tempera-

A. S. T. M. END QUENCH TEST FOR HARDENABILITY OF STEEL (A 255 - 48 T)

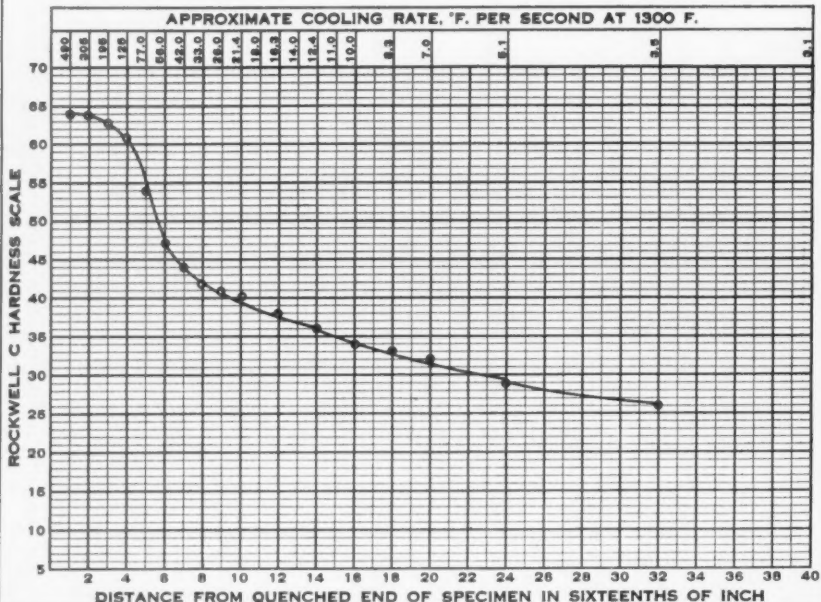
DATE _____
LABORATORY _____
TYPE SPECIMEN _____
TEST NO. _____

TYPE	HEAT NO.	GRAIN SIZE	C	Mn	P	S	Si	Ni	Cr	Mo	NORM. TEMP. °F.	QUENCH TEMP. °F.

REMARKS:

End Quench Hardenability for a typical heat of E 52100.

(Specimen was spheroidized annealed and end quenched from 1550 F.)

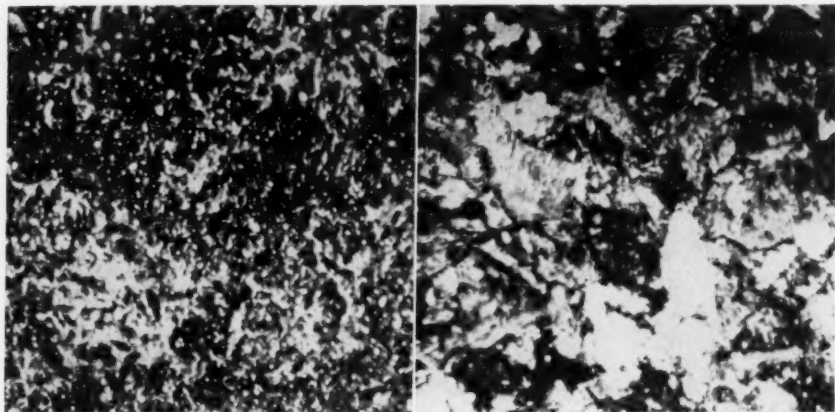


ture. They were sectioned and the hardness was measured at mid-wall. Generally the *surface* hardness was higher than the mid-wall values shown in Table I. Normalizing temperatures between those reported would have given intermediate hardness values.

In summary, the type of processing described here is not suitable where service applications require either maximum or precisely uniform properties. It is useful where intermediate properties are adequate and where quenching facilities are not available, or where the economies in time and equipment utilization warrant the perhaps higher price of a suitable alloy grade. Many of the medium carbon alloy steels are suitable for this type of process. If a steel other than E52100 were to be used as described above, the as-normalized hardness vs. section thickness relationship would need to be developed.

Distance from Quenched in 1/16"	Hardness (Rockwell C)
1	64
2	64
3	63
4	61
5	54
6	47
7	44
8	42
9	41
10	40
12	38
14	36
16	34
18	33
20	32
24	29
32	26

End quench hardenability data for typical heat of E52100. (Specimen was spheroidized annealed and end quenched from 1550 deg.)



(Left) AISI E52100 steel as heat treated for use in a ball bearing. Steel is quenched to room temperature from 1550 degrees Fahrenheit in oil and held for 4 hours at 350 degrees Fahrenheit. Hardness, Rockwell C 59;

magnification, 1000 X; Nital etch. (Right) The same steel but after air cooling from a temperature of 1750 degrees Fahrenheit. Section thickness, 0.400 inch; hardness, Rockwell C 41; magnification, 1000 X; Nital etch.

High Temperature Working of Molybdenum and Tungsten

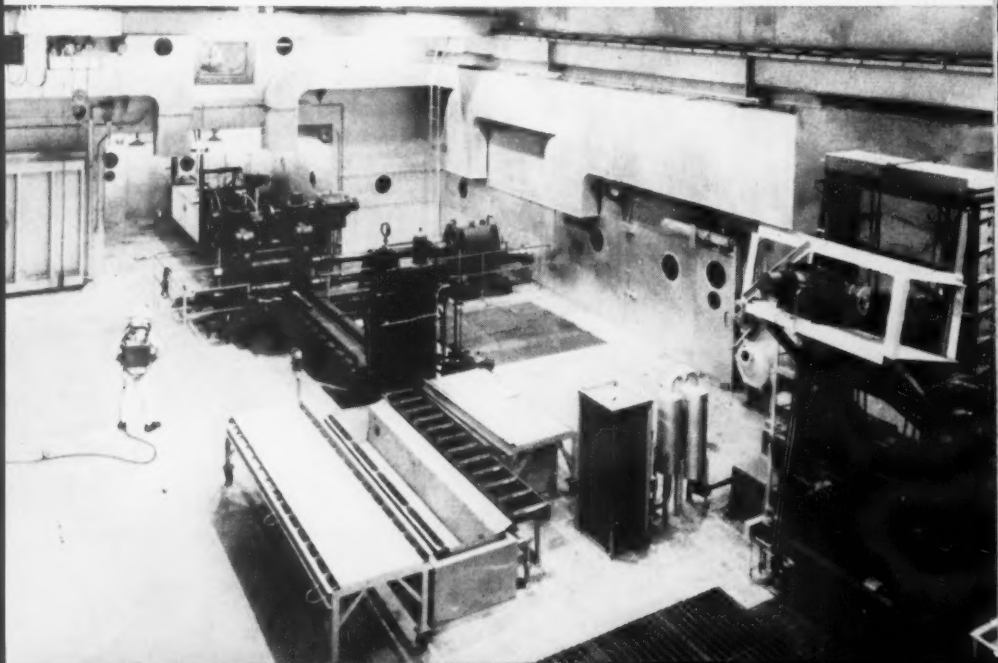
*Space age facility begins production of
ultra high temperature metals.*

In its unique new InFab (Inert-Fabrication) facility, Universal-Cyclops Steel Corporation, Bridgeville, Pennsylvania, has started producing refractory metals of unusually high integrity for future hypersonic

aircraft and aerospace weapons. These materials offer great promise for applications requiring high strength at ultra high temperatures.

InFab was conceived, designed, and constructed by the Refractomet

Interior view of InFab facility designed and constructed by Universal-Cyclops Steel Corporation in technical cooperation with Department of the Navy, Bureau of Naval Weapons.



"Two personnel 'crash' doors are built into the facility."

Division of Universal-Cyclops in technical cooperation with the Department of the Navy, Bureau of Naval Weapons. Its purpose is the production of high integrity mill products of the refractory metals such as molybdenum, columbium, tantalum, tungsten, and their various alloys.

The InFab facility is a welded steel enclosure 42 feet wide x 97 feet long x 23 feet high. Inside the enclosure are an impactor, rolling mill, furnaces, a ten-ton crane and space for additional equipment. Forging and rolling of these refractory metals will be performed at temperatures up to 4500 degrees F. in a protective atmosphere of argon gas.

InFab's complex respiratory system cools, conditions, and purifies the argon atmosphere in the facility to a purity level of 99.995 percent. During operations temperatures in the facility range from 80 to 100 degrees Fahrenheit.

The impactor, rolling mill, and furnaces were designed to be fully automatic and are controlled from consoles outside the facility. Each console has a full view of the operations it controls through a special glass "picture window" which effectively shields out harmful ultra-violet rays which are emitted from the white hot metal.

Some manual handling is required in taking materials into the facility and transferring them between the equipment. This particular work is accomplished with the aid of the ten-ton crane.

The InFab technicians are dressed in a modified design of future space



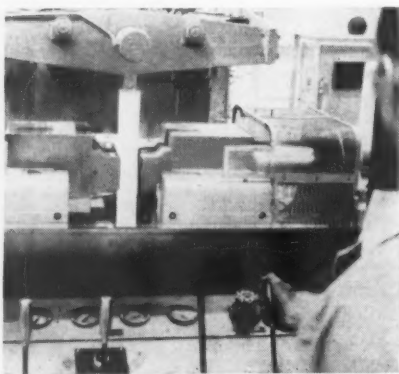
Technician bringing molybdenum ingot into plant through tube-shaped materials lock.

suits. It is a four-layer gas-tight suit with an outer garment which provides shielding from thermal and ultra-violet radiation. The technicians carry their air supply and a cooling unit on their back. Once within the facility, the technicians connect their communications and power supply line into conveniently located outlets.

Men, material and equipment move in and out of InFab through three specially designed locks. The locks are vital to the maintenance of the extreme argon purity required and to keep the loss of argon gas to a minimum. The argon is maintained at a pressure just above atmospheric to prevent contaminating air from leaking in. Two personnel "crash" doors are built into the facility. Other precautionary features are included to absolutely ensure the complete safety of personnel.

The refractory metals, formed from metal powders by compaction and

"... ingots are heated in induction furnaces ..."



Automatic impactor in action. View is from remote control station outside enclosure. Ingot is heated up to 4500 deg. F., the ideal working temperature. Horizontal forge delivers an impact of 15,000 foot pounds.

sintering into electrodes, are melted into high quality ingots in a specially designed consumable-electrode vacuum arc furnace. The furnace produces 12-inch diameter ingots, 70 inches long, weighing up to 3,000 pounds.

Under the force of the horizontal impactor, ingots are broken down into billets or sheet bar at temperatures up to 4500 degrees F. in the protective argon environment. The fully automatic, remote control impactor hits the ingot on two sides with 15,000 foot pounds of force. The ingots are heated in induction furnaces located immediately below the forging zone. The normal product of the impactor will be 4-inch round-cornered square billets and sheet bars measuring 2 inches by 10 inches in cross-section.

If further processing is desired, the billet and sheet bar will be trans-

ferred to the rolling mill area. They are then heated in a graphite lined indirect induction furnace at the end of the rolling mill table. A molybdenum liner inside the furnace protects the metal from reaction with the graphite. The InFab rolling mill will roll refractory metals into bar and sheet at temperatures up to 4000 degrees F. The rolling is operated from a console outside the facility; motorized roll tables and associated equipment such as the alligator shear, bar turner and pinch rolls permit fully automatic operation.

The two-high 16-inch by 36-inch mill resembles a miniature blooming mill in many respects. It is equipped with both flat and grooved rolls and can produce bars down to one-half inch diameter and sheet up to 15 inches wide and 96 inches long. Through pack rolling, sheet gauges of 0.020 inch will be obtainable.

InFab's ideal fabrication conditions will permit the elimination of many conditioning and annealing operations necessary under current processing practices. It is anticipated that higher product yield and reduced number of processing operations may permit the production of vastly superior refractory metals and their alloys at the approximate cost level of those exotic metals now commercially available.

InFab offers new horizons in metal processing. "Through InFab, metallurgy, which today is both an art and a science, will move to more precise systematized processing," according to Mr. P. C. Rossin, General Manager of the Refractomet Division of Universal-Cyclops Steel Corporation.

"Packaged Handling" Plan Reduces Parts Damage

Simple, inexpensive wooden devices for in-plant handling of small gas turbine parts are cutting costs by saving time and reducing parts damage at Boeing Airplane Company's Industrial Products Division in Seattle.

Painted a bright yellow for maximum visibility, the new handling equipment offers the dual advantages of "open" packaging and identification plus the protection and separation necessary to prevent damage during various in-plant handling phases prior to final assembly. Previous protective handling measures, including wrapping and the use of cardboard containers and separators,

have been supplanted by the new system.

The new parts handling system uses plywood peg boards, frames, boxes and dividers to protect and separate parts for small gas turbine engines manufactured by Boeing. Parts thus protected range from accessory drive housings to bearing retainers.

Handling equipment is specially designed for multiple use. It includes interchangeable slotted dividers used with skid-mounted metal bins or roller equipped smaller parts carriers; skids with large peg boards mounted on A-frames; and smaller peg boards with dowel type fixtures.

Various applications of the new handling equipment: Skid-mounted peg board A-frame, left, holds accessory drive end caps. Dowels

hold accessory drive gears. "Egg crate" holds bearing retainers. Metal bin with slotted dividers holds accessory drive housings.





The Machine Tool Exposition - 1960

September 6-16, Chicago International Amphitheatre

The Machine Tool Exposition, presented only every five years by the National Machine Tool Builders' Association, is the great event of the metalworking world—the event that in 1955 brought 103,000 production executives from all over the world to Chicago. It will be the first showing of the immense advances that have been made in machine tool design in the United States during the past five years. Particularly dazzling will be the revealed progress in numerical controls. With The Machine Tool Exposition-1960, metalworking fully enters the electronic age.

It will be the first exhibition since the 1955 exposition in which virtually the whole of the U. S. machine tool industry has presented its products. The estimated value of the machine tools to be actually exhibited is \$25,000,000. It will show technological developments that go to the

very heart of cost reduction and production efficiency in modern industry. It is the largest industrial exposition held in the United States. Its exhibition and service areas will occupy more than 12 acres. It will be almost 25 percent larger than its huge predecessor in 1955.

The great majority of machine tools exhibited will be in actual operation. Tons of metal will be machined on these tools each day of the exposition.

Only machine tools will be exhibited at the exposition (aside from exhibits of metalworking publications and service companies). More than 1,000 major machines will be shown, virtually all of which will have been designed and built specifically for first showing in the exposition.

To provide information about equipment directly accessory to machine tools, there will concurrently be held, by agreement with NMTBA,

the Production Engineering Show on Navy Pier. Both wings of Navy Pier will be devoted to exhibits of mechanisms, instruments, and equipment that will contribute to greater production efficiency. Exhibits will be presented by approximately 250 companies.

Registration at The Machine Tool Exposition-1960 will admit visitors to the Production Engineering Show—and vice versa—at no additional registration fee. Shuttle buses will make non-stop trips between the

Navy Pier and the International Amphitheatre.

The new Inquiry Time Saver plates obtained at either exposition may be used at the other. Hours of the two expositions are such as to permit visitors a maximum opportunity to see exhibits at both.

On several following pages appear floor plans of the Chicago International Amphitheatre, showing company booth locations and numbers, as well as a list of the exhibitors at The Machine Tool Exposition-1960.

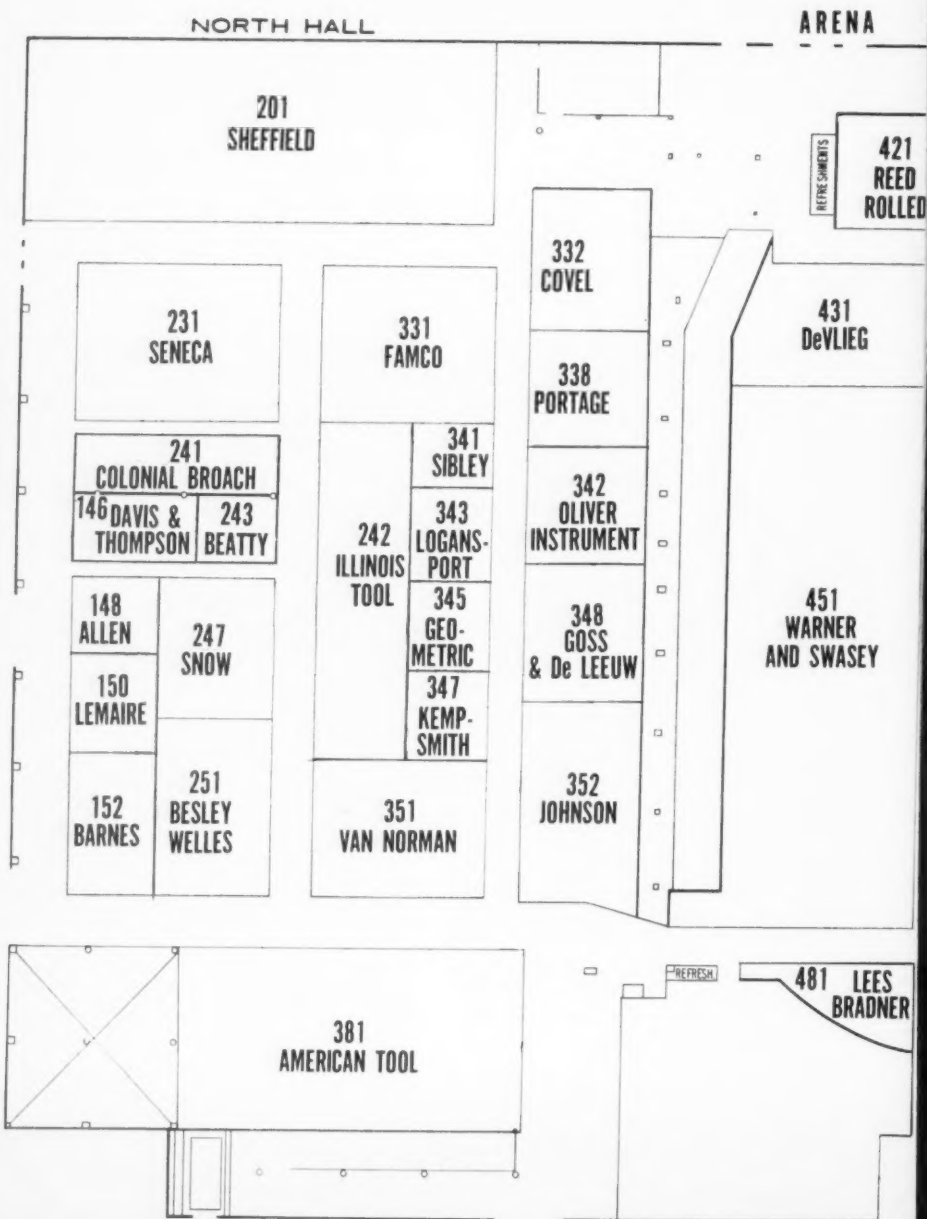


The first machine to arrive for the forthcoming Machine Tool Exposition-1960 at Chicago's International Amphitheatre (September 6-16) was this towering press, product of the Hydraulic Press Manufacturing Company, a Division of Koehring Company, Mount Gilead, Ohio. The triple action hydraulic machine is completely electronically controlled and is said to have a capacity of 200 tons.



Handled like a baby is this heavy hydraulic press brake being prepared for rolling into Chicago's International Amphitheatre. Among the first of 1050 modern machine tools to arrive for the Exhibition, the press brake is a product of the Cleveland Crane & Engineering Company. Due to the weight of the machine, a 45-ton truck-mounted crane is used to swing it from scow to rollers.

Floor Plans of Chicago



International Amphitheatre

ARENA

SOUTH HALL

422
PEERLESS

REFRESHMENTS

701
MONARCH

432
LANDIS MACHINE

531
EDLUND

631
LELAND-GIFFORD

632
CLEEREMAN

731
KINGSBURY

452
BROWN
AND SHARPE

541
GREENERD

543
ATLANTIC

547
KENT-OWENS

542
LAKE
ERIE

641
W. F. & JOHN
BARNES

642
CLEVELAND
HOBBING

741
BARDONS
& OLIVER

745
EASTERN
MACHINE
SCREW

652
PARKER
HANNIFIN

749
ONSRUD

651
NORTON

751
GALLMEYER
AND LIVINGSTON

482
POPE

486 HAMILTON

781
NATIONAL ACME

Floor Plans International

EXPOSITION HALL



811
GARDNER

823
LANDIS TOOL

800
FOSDICK

810
LeBLOND

814
CLEVELAND
CRANE

822
MOTCH & MERRYWEATHER

923
BARBER-COLEMAN

W. I.

900
CLEVELAND AUTOMATIC

908
LeBLOND

910
SNYDER

914
DENISON

1001
ROCKFORD

1011
HYDRAULIC PRESS

924
HEALD

1008
KEARNEY & TRECKER

1014
SUNDSTRAND

1034
CINCINNATI

1110
SPRINGFIELD


1116
L & J PRESS

1120
AMER. GAGE

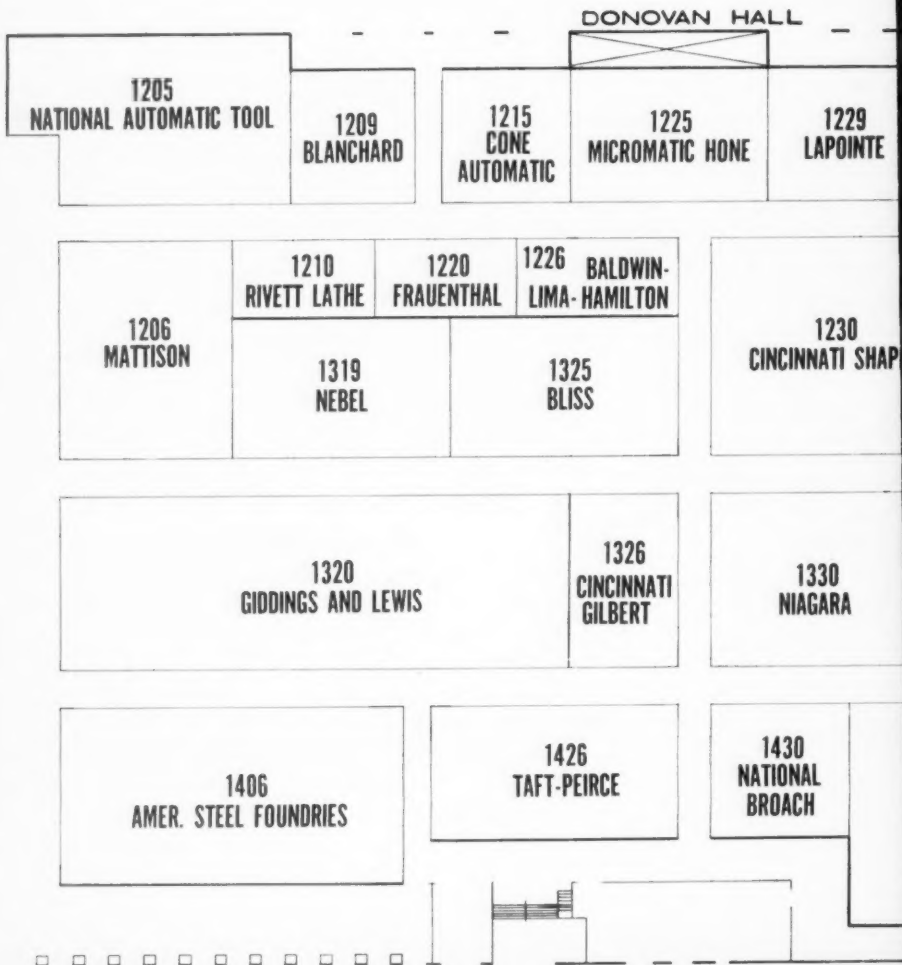
1122
FERRACUTE

of Chicago Amphitheatre

EXPOSITION HALL

825 LANDIS TOOL		839 JONES & LAMSON		849 CARLTON MACHINE		
824 NIGHT	828 BODINE	834 BURG	838 NEW BRITAIN	842 U. S. TOOL	846 EKSTROM, CARLSON	850 THOMPSON GRINDER
929 FELLOWS GEAR				945 MICHIGAN TOOL		
928 CINCINNATI MILLING		934 CINCINNATI LATHE AND TOOL	936 BRYANT	946 EX-CELL-O		
1027 PRODUCT DIV. CIN. MILLING						
MILLING			1042 GISHOLT	1046 LODGE & SHIPLEY	1050 MORTON	
					1149 WYSONG AND MILES	
		1134 DREIS & KRUMP	1136 PARKER-MAJESTIC	1142 BAIRD		

Floor Plans of the International



Chicago Amphitheatre

List of Exhibitors

Company Name

Booth No.

- A -

Allen Co., Chas. G.	148
American Gage and Machine Co., Size Control Div.	1120
American Steel Foundries, Elmes & King Div.	1406
American Tool Works Co.	381
Armstrong-Blum Mfg. Co.	1340
Atlantic Machine Tool Co.	543

- B -

Baird Machine Co.	1142
Baldwin-Lima-Hamilton Corp., Hamilton Div.	1226
Barber-Colman Co.	923
Bardons and Oliver, Inc.	741
Barnes Co., W. F. and John	641
Barnes Corp., John S.	641
Barnes Drill Co.	152
Beatty Machine and Mfg. Co.	243
Besley-Welles Corp.	251
Blanchard Machine Co.	1209
Bliss Co., E. W.	1325
Bodine Corp.	828
Brown and Sharpe Mfg. Co.	452
Bryant Chucking Grinder Co.	936
Buffalo Forge Co.	551
Buhr-Sidney Machine Tool Co.	1440
Burg Tool Mfg. Co., Inc.	834

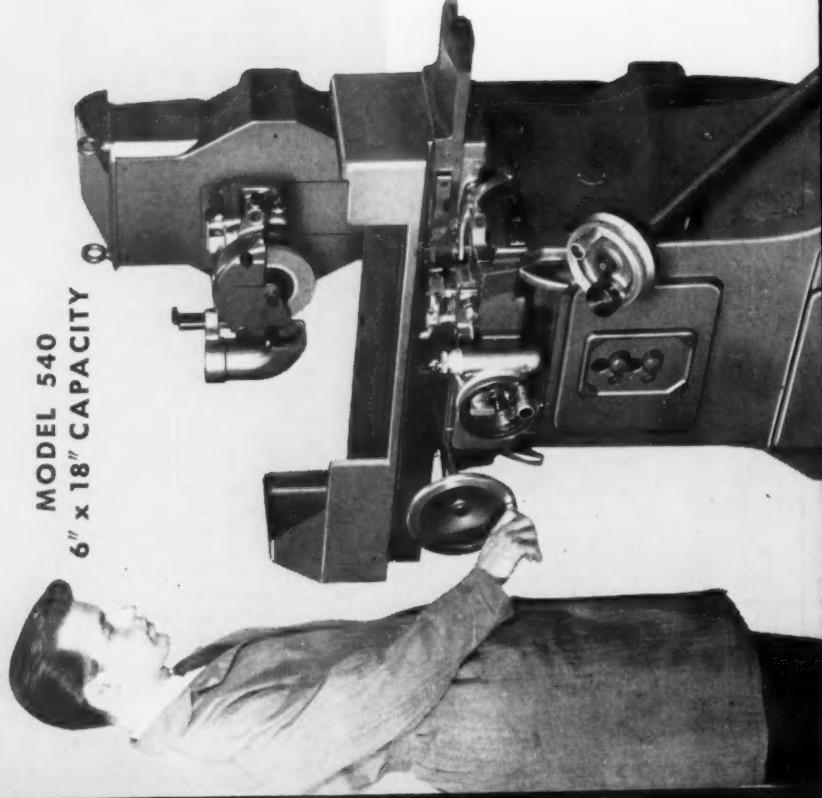
- C -

Carlton Machine Tool Co.	849
Cincinnati Gilbert Machine Tool Co.	1326
Cincinnati Lathe and Tool Co.	934
Cincinnati Milling Machine Co.	928
Cincinnati Milling Machine Co., Machine Tool Div.	1034
Cincinnati Milling Machine Co., Products Div.	1027
Cincinnati Shaper Co.	1230
Cleereman Machine Tool Corp.	632

	1249 WIEDEMANN		
1240 HILL ACME	1250 DANLY		
1339 MINSTER			
1340 ARMSTRONG-BLUM		1350 GRAY	
		1439 GREAVES	1445 MORRIS
1440 BUHR SIDNEY	1444 K. R. WILSON	1450 STAND. ELEC.	

HYDRAULIC SURFACE GRINDER

MODEL 540
6" x 18" CAPACITY




ACCURACY...

EFFICIENCY...

EASE OF OPERATION

This machine has all the essential qualities required to provide high caliber surface grinding. Its simplicity of design provides ease of operation while inherent accuracy and efficiency assure excellent grinding performance. Thousands of



FEATURES:

- Completely centralized controls within easy reach of operator.
- Patented low-pressure, long-life Hydraulic System operating from self-contained motor-driven pump unit.
- Table traverse rates variable from 5' to 40' per minute. Smooth and shockless reversing at maximum speeds.
- Cross-feed automatically variable from .01 in. to .07 in. per stroke.
- Hand controls provided for both traverse and cross-feed. Micrometer adjustment to cross-feed in .0001 in. divisions.
- Vertical adjustment of wheelhead controlled by conveniently placed handwheel having a micrometer knob adjustment in .0001 in. divisions.
- Wheelhead slide operates on ball bearing rollers running on precision ground bars providing absolute sensitivity of vertical feed.

Automatic vertical wheelhead feed and electric lift can be fitted to standard machine as an extra feature. Also, numerous other attachments including form tool grinding equipment are available to assure full versatility.

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MICROMATIC HONE CORP.

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List of Exhibitors . . .

Company Name	Booth No.	Company Name	Booth No.
Cleveland Automatic Machine Co.	900	Hill Acme Co.	1240
Cleveland Crane and Engr. Co.	814	Hydraulic Press Mfg. Co., Div. Koehring Co.	1011
Cleveland Hobbing and Machine Co., Div. Textron, Inc.	642	- I -	
Colonial Broach and Machine Co.	241	Illinois Tool Co.	242
Cone Automatic Machine Co., Inc.	1215		
Covel Mfg. Co.	332		
- D -		- J -	
Danly Machine Specialties, Inc.	1250	Johnson Machine and Press Corp., Div. Bontrager Corp.	352
Davis and Thompson Co.	146	Jones and Lamson Machine Co.	839
Denison Engr. Div., American Brake Shoe Co.	914	- K -	
DeVlieg Machine Co.	431	Kearney and Trecker Corp.	1008
Dreis and Krump Mfg. Co.	1134	Kempsmith Machine Co.	347
- E -		Kent-Owens Machine Co.	547
Eastern Machine Screw Corp.	745	Kingsbury Machine Tool Corp.	731
Edlund Machinery Co., Div. Harsco Corp.	531	Knight Machinery Co., W. B.	824
Ekstrom, Carlson and Co.	846	- L -	
Ex-Cell-O Corp.	946	L & J Press Corp.	1116
- F -		Lake Erie Mchry. Corp.	542
Famco Machine Co.	331	Landis Machine Co.	432
Fellows Gear Shaper Co.	929	Landis Tool Co.	823, 825
Ferracuta Machine Co.	1122	Lapointe Machine Tool Co.	1229
Fosdick Machine Tool Co.	800	LeBlond Machine Tool Co., R. K.	810, 908
Frauenthal Div., Kaydon Engr. Corp.	1220	Lees-Bradner Co.	481
- G -		Leland-Gifford Co.	631
Gallmeyer and Livingston Co.	751	LeMaire Machine Tool Co.	150
Gardner Machine Co.	811	Lodge and Shipley Co.	1046
Geometric Tool Co., Div. United-Greenfield Corp.	345	Logansport Machine Co., Inc.	343
Giddings and Lewis Machine Tool Co.	1320	- M -	
Gisholt Machine Co.	1042	Mattison Machine Works	1206
Goss and de Leeuw Machine Co.	348	Michigan Tool Co.	945
Gray Co., G. A.	1350	Micromatic Hone Corp.	1225
Greaves Machine Tool Div., J. A. Fay and Egan Co.	1439	Minster Machine Co.	1339
Greenerd Arbor Press Co.	541	Monarch Machine Tool Co.	701
- H -		Morris Machine Tool Co.	1445
Hamilton Tool Co.	486	Morton Mfg. Co.	1050
Hannifin Co., Div. Parker-Hannifin Corp.	652	Motch and Merryweather Machinery Co.	822
Heald Machine Co.	924	- N -	
		National Acme Co.	781
		National Automatic Tool Co., Inc.	1205
		National Broach and Machine Co.	1430
		Nebel Machine Tool Corp.	1319
		New Britain Machine Co.	838

Company Name Booth No.

Niagara Machine and Tool Works1330
Norton Co.651

- O -

Oliver Instrument Co.342
Onsrud Machine Works, Inc.749

- P -

Parker-Majestic, Inc.1136
Peerless Machine Co.422
Pope Machinery Corp.482
Portage Machine Co.338

- R -

Reed Rolled Thread Die Co.421
Rivett Lathe and Grinder, Inc.1210
Rockford Machine Tool Co.1001

- S -

Seneca Falls Machine Co.231
Sheffield Corp.201
Sibley Machine and Foundry Corp.341
Snow Mfg. Co.247
Snyder Corp.910
Springfield Machine Tool Co.1110
Standard Electrical Tool Co.1450
Sundstrand Corp.1014

- T -

Taft-Peirce Mfg. Co.1426
Thompson Grinder Co.850

- U -

U. S. Tool Co., Inc.842

- V -

Van Norman Machine Co.,
Div. Van Norman Industries, Inc.351

- W -

Warner and Swasey Co.451
Wiedemann Machine Co.1249
Wilson, Inc., K. R., Hydraulic Div.1444
Wysong and Miles Co.1149

List of Exhibitors

Non-Members NMTBA

(Second Floor, North Hall,
International Amphitheatre)

Company Name Booth No.

- A -

American Machinist, McGraw-Hill
Publishing Co.1548
Anderson Oil & Chemical Co., Inc.1531

- C -

Chilton Co., The1536

- G -

General Electric Co.1539

- H -

Hitchcock Publishing Co.1506
Houghton & Co., E. F.1538

- K -

Kennametal Inc.1500

- M -

Machinery, The Industrial Press1530
Metalworking Publishing Co.1518
Mobil Oil Co., Div. of Socony Mobil Oil1527
Modern Machine Shop,
Gardner Publications, Inc.1535

- P -

Production Magazine,
Bramson Publishing Co.1521

- S -

Screw Machine Products1532
Steel, Penton Publishing Co.1509
Sun Oil Co.1513
Sweet's Catalog Service,
Div. of F. W. Dodge Corp.1542

- T -

The Tool Engineer1514

- V -

Vickers, Inc.1508

- W -

Wilson-Carr Inc.1512



DI-ACRO ROD PARTER **cuts off 3,250 pieces/hr.** **for Geometric Stamping Co.**

Donald Boyd, methods engineer, shows parted stock and the formed part, handle for material handling equipment.

About 1½ million pieces of bar stock are parted off each year on a Di-Acro Power Rod Parter at the Geometric Stamping Co. Div. of Euclid Stamping Co. in Cleveland. Twenty-foot lengths of 5/16" cold drawn steel are cut to 7" pieces at a rate of 3,250 pieces per hour.

"Instead of investing in a single purpose punch press die," says Donald Boyd, methods engineer, "We picked the power parter for its versatility. On this job and a variety of other work the power parter has increased production two times—it's actually twice as fast. Incidentally, there has been little or no maintenance other than periodic lubrication and resharpening of die heads."

For your bar stock up to 5/8" in diameter, investigate the Di-Acro Rod Parter. Speedmatic gauge cuts as fast as operator can feed. Minimum distortion—pieces can be threaded without deburring. One standard die cuts eleven sizes of rod. Special heads for square, hex and other shapes.



DI-ACRO HAND OPERATED ROD PARTER

Same size-range and accurate parting as power parter. Ejectomatic gauge automatically clears die after each cut.

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For free booklet, "Handy Guide to Rod Parters," consult yellow pages under Machinery—Machine Tools for your nearest Di-Acro distributor, or write us.



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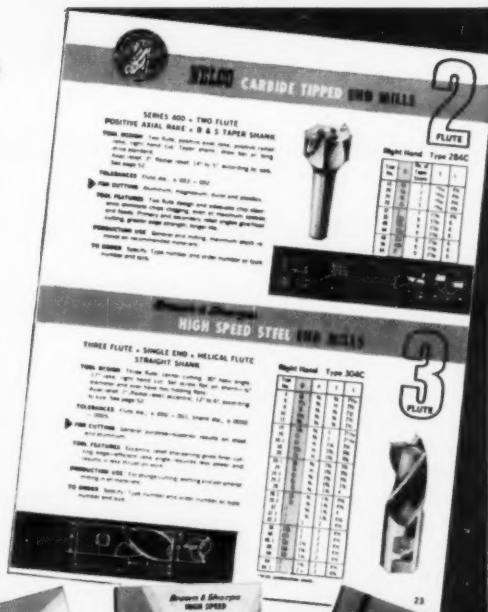
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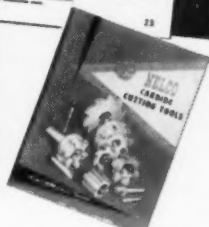
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Production Engineering Show

September 6-16, Chicago Navy Pier

Automation, the key to manufacturing during the 1960's, will be the theme of most exhibits at the Production Engineering Show. The huge exposition, twice the size of the one held five years ago, will cover both sections of Chicago's Navy Pier and will run concurrently with the Machine Tool Exposition-1960 at the International Amphitheatre, September 6 through 16.

Both shows will be managed by Clapp & Poliak, Inc., New York. The Machine Tool Exposition-1960 is sponsored by the National Machine Tool Builders' Association. The Production Engineering Show is presented by agreement with the association but is independent of it.

The \$10,000,000 exhibit at Navy Pier will show the equipment and products which keep machine tools running. Control equipment of every conceivable type, machine components, auxiliary equipment and supplies, intraplant communications, safety equipment, materials handling equipment, inspection and gaging equipment, testing equipment, and dozens of types of special production equipment will not only be shown but demonstrated under simulated factory conditions.

The 125,000 expected visitors will thus have an opportunity to see the machine tools in operation at the

International Amphitheatre and see the equipment which makes the tools run—and maintains them—at Navy Pier. The same badge and the same registration fee will admit the visitor to both shows. The same Inquiry Time Saver Plate—to save visitor's time in requesting information—will be used at both shows. Buses will run from hotels to both the Navy Pier and Amphitheatre, as well as back and forth between the two halls.

Hours of both shows have been dovetailed to permit visitors to see one show while the other is closed. The Machine Tool Exposition-1960 will be open from 10 a.m. to 5:30 p.m., while the Production Engineering Show hours will be from 1 to 10 p.m. Both shows will be open Saturday and closed Sunday.

Many of the controls and other auxiliary equipment exhibited at the Production Engineering Show will be used by exhibitors at the Machine Tool Exposition to keep the machine tools running there. Thus, visitors will be able to inspect the equipment at Navy Pier and see how it works when attached to huge machine tools at the International Amphitheatre.

Following is a list of companies that will have exhibits at the Production Engineering Show, as well as floor plans of the Navy Pier, showing booth locations and numbers.

List of Exhibitors

Company Name	Booth No.	Company Name	Booth No.
- A -			
A & A Mfg. Co., Inc.	481	Chicago Rivet & Machine Co.	236
ACF Electronics Div., ACF Industries, Inc.	610	Chicago Tool & Engr. Co.	523
Adamas Carbide Corp.	153	Chicago Wheel & Mfg. Co.	383
Amp, Inc.	535	Clark Controller Co.	137
Acro Div., Robertshaw-Fulton Controls Co.	306	Clark, Cutler & McDermott	227
Advance Products Corp.	300	Caggsdill Tool Products, Inc.	515
Airmatic Valve, Inc.	483	Collins Microflat Co.	424
Alemite Div., Stewart-Warner Corp.	251	Commander Mfg. Co.	321
Allen-Bradley Co.	216	Consolidated Kinetics Corp.	622
Allis Co., Louis	127	Copy-Craft, Inc.	258
Aloris Tool Co.	470	Crafts Co., Inc., Arthur A.	454
American Edelstaal, Inc.	353	Cramer Controls Corp.	456
American Electronics, Inc.,		Cranan Co., Walter	472
Industrial Machinery Div.	604	Crown Tool, Inc.	443
American Machinist	131	Crucible Steel Co. of America	307
American Metal Forming Co., Inc.	462	Cuno Engr. Corp.	529
American Sealants Co.	480	Curtiss-Wright Corp., Marquette Div.	378
Arcair Co.	460	Cushman Chuck Co.	128
Armstrong Bros. Tool Co.	238	Cutler-Hammer, Inc.	142
Arrow-Hart & Hegeman Electric Co.	267		
Associated Spring Corp.	204	- D -	
Atkins Saw Div., Borg-Warner Corp.	326	Dake Corp.	211
Automatic Switch Co.	132	Dazor Mfg. Corp.	256
- B -		Delco Products,	
Balcrank, Inc., Machine Tool Div.	304	Div. of General Motors Corp.	223
Barry Controls Inc.	387	Deluxe Coils, Inc.	441
Bendix Corp., Industrial Controls Section	530	Denison Mfg. Co., R. B.	406
Blakeslee & Co., G. S.	330	De Van-Johnson Co.	477
Boeing Airplane Co.	528	Devcon Corp.	230
Boston Gear Works	123	DeVilbiss Co.	336
Brady Co., W. H.	257	DeVry Technical Institute	607
Breuer Electric Mfg. Co.	423	Die-Draulic Grip, Inc.	264
Bristol Co.	407	Diehl Mfg. Co.	136
Brook Motor Corp.	601	DoAll Co.	116
Browning Mfg. Co.	252	Durant Mfg. Co.	302
Buchanan Electrical Products Corp.	507		
Buck Tool Co.	244	- E -	
- C -		Eagle Signal Co.	381
C.I.T. Corp.	210	Eclipse Machine Div., Bendix Corp.	614
Camloc Div., Empire Products, Inc.	427	Electro Dynamic Div.,	
Casting Engineers Div.,		General Dynamics Corp.	606
Consolidated Foundries & Mfg. Corp.	457	Electronics Systems Corp. of America	485
Chicago Powdered Metal Products Co.	429	Empire Corp.	379
Chicago Reference Book Co.	331	Enco Mfg. Co.	468
		Encyclopedia Britannica	335
		Engineered Electronics Co.	363
		Engis Equipment Co.	467
		Etico Tool & Machine Co., Inc.	247

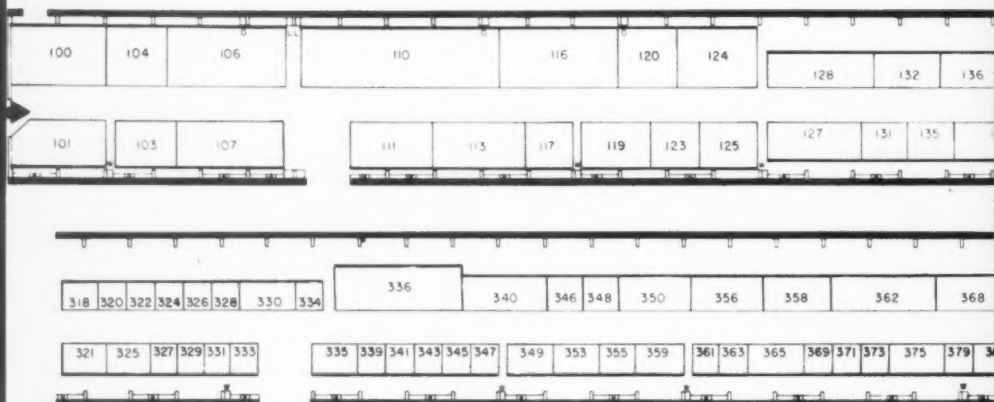
List of Exhibitors . . .

Company Name	Booth No.	Company Name	Booth No.
- F -		- K -	
Fafnir Bearing Co.	217	Kennametal, Inc.	111
Fairbanks, Morse & Co.	350	Korfund Co.	506
Farrand Controls, Inc.	103		
Farrington Mfg. Co.	209	- L -	
Fawick Airflex Co., Inc.	224	La Salle Steel Co.	147
Federal Bearings Co., Inc.	310	Lear, Inc.	611
Federal Pacific Electric Co.	445	Lempco Industrial, Inc.	362
Felters Co.	359	Lima Electric Motor Co.	215
Fenway Machine Co., Inc.	437	Lindberg Engr. Co.	225
Ferguson Machine Corp.	246	Lowell Industries, Inc.	333
Field Abrasive Mfg. Co.	500	Lubriquipment Engineers Inc.	475
Florida Development Commission	208	Lufkin Rule Co.	426
Formsprag Co.	325	Luxo Lamp Corp.	605
Friden, Inc.	334		
Furnas Electric Co.	511	- M -	
- G -		MB Electronics, Div. of Textron Electronics Inc.	504
Gaertner Scientific Corp.	346	Machinery Electrification, Inc.	459
Gast Mfg. Corp.	512	MacRae's Blue Book	341
General Automation Corp.	516	Magnaflux Corp.	400
General Electric Co.	110	Manheim Mfg. & Belting Co.	476
General Radio Co.	630	Marathon Electric Mfg. Corp.	249
Gilman Engr. & Mfg. Co.	205	Marlin-Rockwell Corp.	125
Graham Transmissions, Inc.	303	Martin Engr. Co.	371
Green Instrument Co., Inc.	320	Marvel Engr. Co.	253
- H -		May-Fran Engr., Inc.	455
Hamilton Mfg. Co.	154	McGill Mfg. Co.	213
Hammond Machinery Builders, Inc.	432	Metal Removal Co.	600
Harman Associates, F. Ward	318	Micro-Poise Engr. & Sales Co.	145
Haydon Div., General Time Corp.	348	Micrometrical Mfg. Co.	418
Hevi-Duty Electric Co.	368	Micro Switch, Div. of Minneapolis- Honeywell Regulator Co.	271
Hitchiner Mfg. Co., Inc.	349	Miller Fluid Power Co., Div. of Flick-Reedy Corp.	106
Hoffman Engr. Corp.	408	Mo-Bar Hydraulic Sales Co.	308
Holo-Krome Screw Corp.	165	Modern Mfg. Co., Inc.	328
Hyatt Bearings Div., General Motors Corp.	433	Moog Servocontrols, Inc.	206
- I -		Morrison Machinery & Engr. Co.	402
Ideal Industries, Inc.	419		
Imperial Brass Mfg. Co.	450	- N -	
Imperial Stamp & Engraving Co.	140	National Diamond Laboratory, Inc.	299
Industrial East Co.	458	National Equipment Rental Ltd.	479
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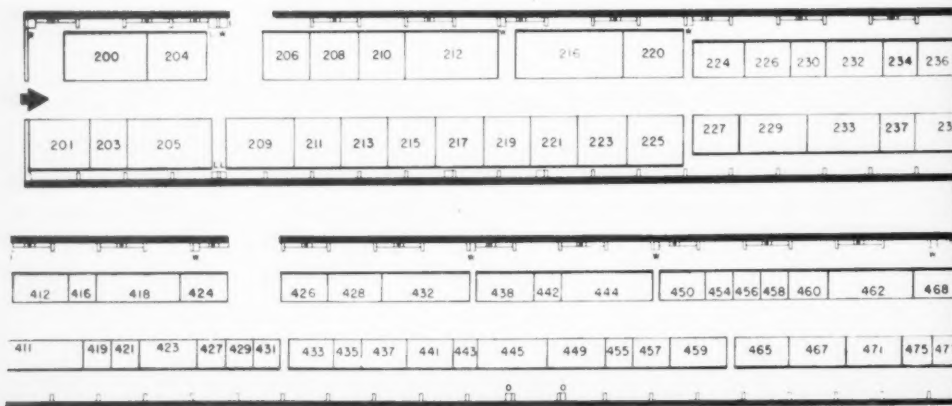
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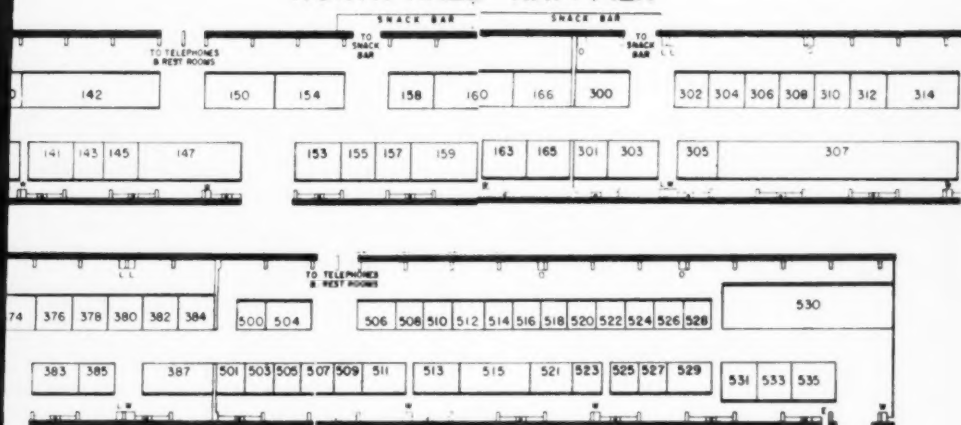


SOUTH HALL—NAVY PIER

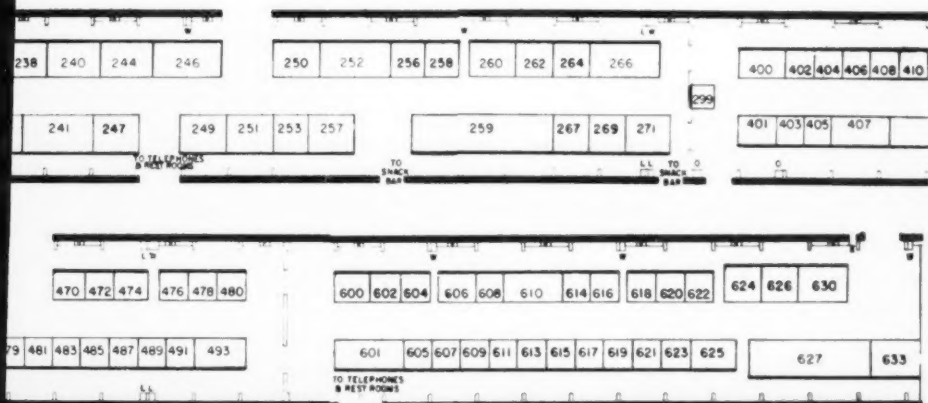


Chicago Navy Pier

NORTH HALL—NAVY PIER



SOUTH HALL—NAVY PIER

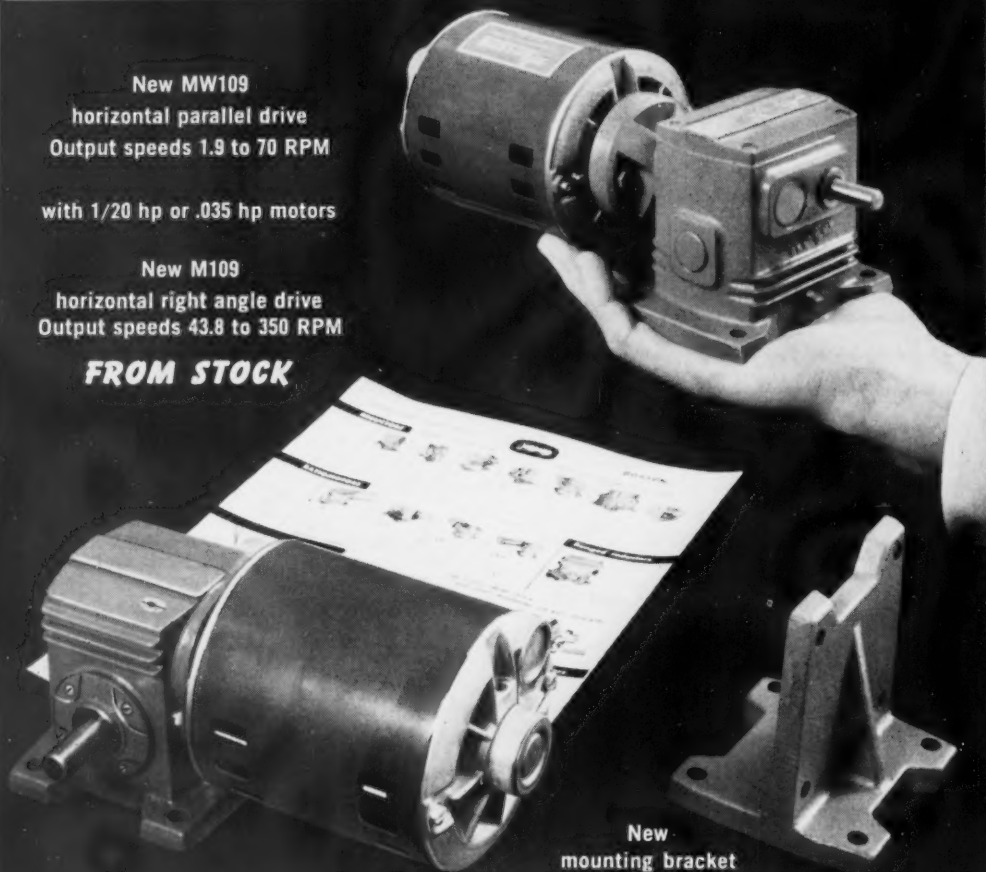


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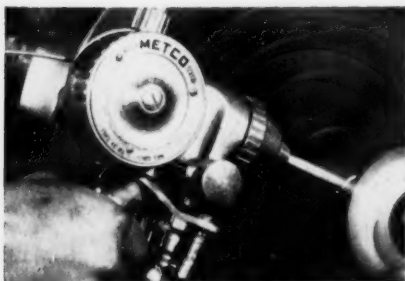
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Second International Coliseum Machinery Show

September 7-15, Chicago Coliseum

Numerous imported machines will vie with the finest in American-made equipment at the Second International Coliseum Machinery Show, Chicago, September 7-15. Machines to be shown will include those of France, Italy, England, West Germany, Belgium, Japan and Canada, as well as the United States.

A. Byron Perkins, president of the show, says the array of cost-saving devices should attract a large percentage of the 100,000 machine users expected in Chicago at that time, when three large widely different shows will be operating simultaneously. Coliseum show hours will be 1 to 10 p.m. daily. The display will not be open on Sunday. Theme of the show is "Profits Through Machine Application."

A major display from afar will be the Mitsubishi milling and boring machines of Japan. These perform a variety of operations, including drilling, tapping, surfacing and gear cutting without moving the work.

Lapointe Machine Company and many other nationally known American firms will be in the show. Merrill Brothers, New York, will exhibit drop forged and heat treated lifting

clamps, hand grips and drum dehead-ers. A precision drill point grinder which produces helical, conventional and split points will be in the Winslow-Matic display.

South Bend Lathe, Incorporated, will show 16-inch lathes and vertical milling machines, while Lennox Tool and Machine Builders will exhibit shearing and forming machines for bench work. Hydraulic grinders, gear hobbing machines and lathes will be seen in the Sigma Machinery booth. Merrill Brothers will exhibit two-ton structural clamps, clamps with universal joints and devices for forklift trucks.

Following is a tentative list of exhibitors that will be at the Second International Coliseum Machinery Show, as well as a floor plan of the Coliseum, showing booth locations.

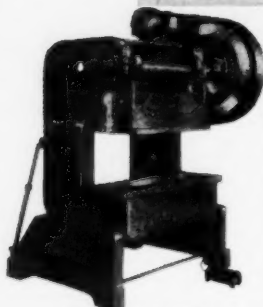
The September issue of *Modern Machine Shop* will include, in addition to latest revised lists of exhibitors and floor plans of the Coliseum Machinery Show, Production Engineering Show and The Machine Tool Exposition, sections illustrating and describing the various machines, tools and equipment that will be on display at each of these expositions.

List of Exhibitors

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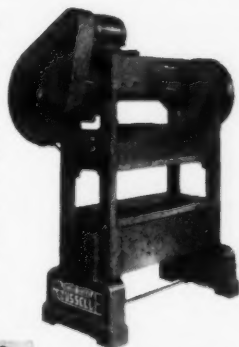
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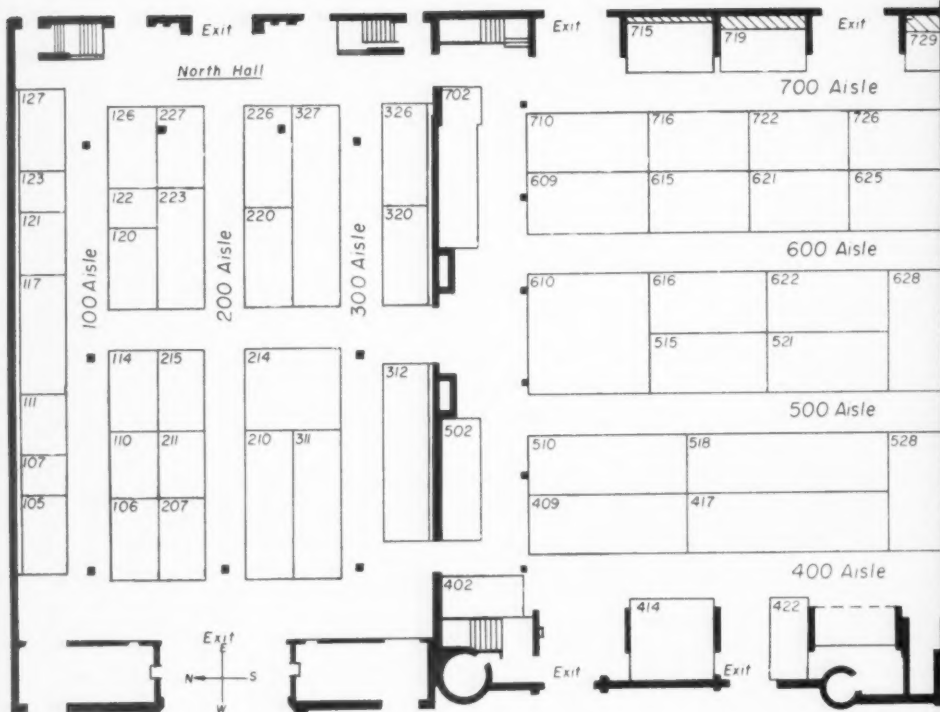
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Floor Plans of the



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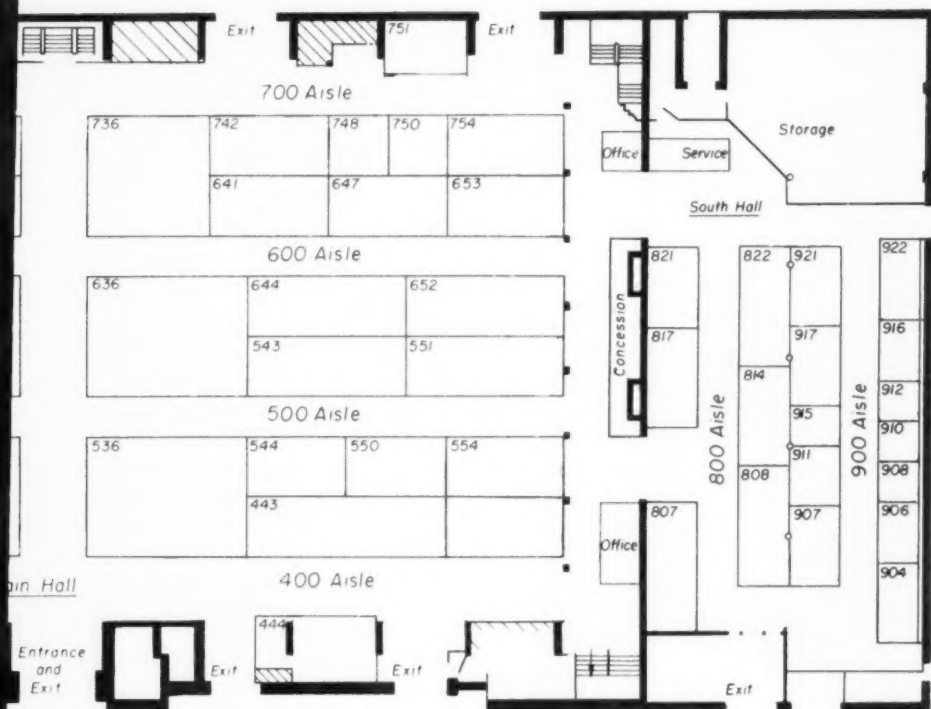
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Chicago Coliseum



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New Spindles for Old!



**Bryant's Exchange Plan
now gives you a \$100
trade-in allowance on any
hi-frequency spindle turned
in for a new Bryant 800 Series
Internal grinding Spindle**

Regardless of make — your old or obsolete hi-frequency spindle can now be exchanged toward a new Bryant 800 Series hi-frequency Spindle with full exchange credit of one hundred dollars.

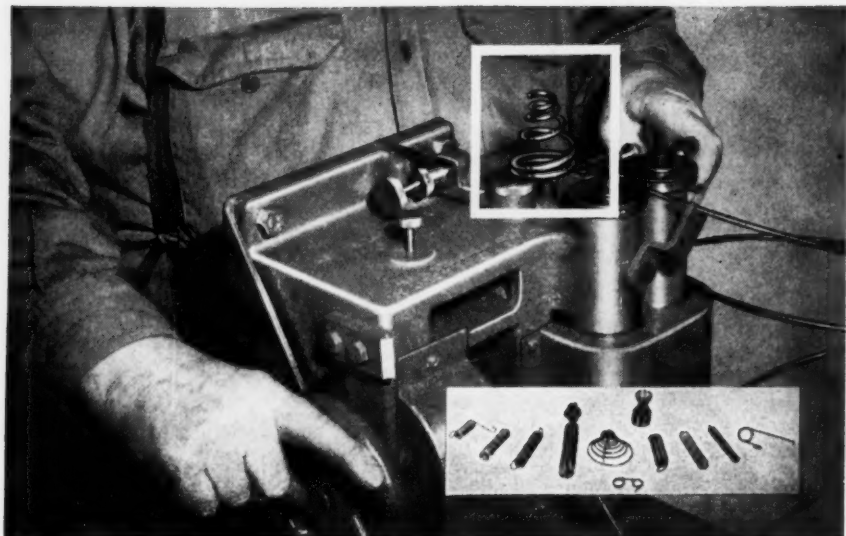
Your old spindle need not be removed from production, or even from spares, until the new Bryant spindle is received. Your new 800 Series will be shipped immediately on receipt of order. Credit for your old spindle will be issued upon receipt of the exchanged spindle at the factory. Call your Bryant or Ex-Cell-O representative for complete details. He'll help you select the proper Bryant equipment for your machines, regardless of make.

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Starrett adjustable jaw cut nippers (left) and Gardener Hook-Kon spring looping tool (center) — handy, precision, time-saving accessories for spring coiling. Perkins Spring Coiler available as bench model or power model shown here, (right) for tool shop or continuous runs.

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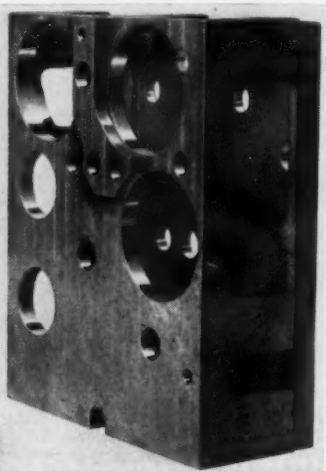
PRODUCTION

Precision Boring Aluminum Gearbox Frame Assemblies

The precision boring machine illustrated herewith, the smallest in the range produced by Ex-Cell-O Corporation of Detroit, Michigan, utilizes the latest multiple spindle concept to bore a total of twenty-two holes in a small aluminum gearbox frame assembly. The operation is achieved by the use of interchangeable plates carrying multiple spindles.

The workpiece, as illustrated herewith, is finish bored in two setups. The five larger holes shown on one side of the part are bored at the first operation. Locating from established dowel holes and hand clamping the part in a simple fixture, tolerances on hole diameters are held to within 0.0005 inch.

The second operation involves boring from both sides. Here the original spindle plate is quickly detached and interchanged with a seven-spindle plate. A ten-spindle component is



The precision boring machine illustrated herewith is tooled to finish bore a total of 22 holes in a small aluminum gearbox frame assembly of the type shown at the right.

MODERNIZATION THROUGH

mounted at the other end of the machine. After one lot is rapidly bored by this method, bronze bushings are assembled in the holes in the workpieces, tools are changed at the machine and operation is repeated.

These parts were formerly bored in a toolroom setup requiring a full day to complete one part; now they are finished in a matter of minutes. Several precautions are taken to ensure consistent accuracy, one of which is the holding of the spindle plates to a constant temperature.

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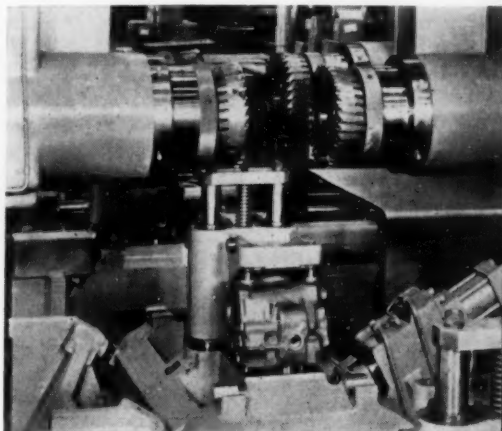
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Milling Transmission Cases to Close Tolerances

Cast-iron transmission cases for a small European car have their overall length dimension established by pairs of milling cutters on a high-precision transfer machine. It is possible to meet the blueprint tolerance of ± 0.0039 inch with these separately fed cutters because a Rigidcut micro-adaptor is used with each. The micro-adaptors, made by Wesson Company, 1220 Woodward Heights Blvd., Ferndale 20, Mich., permit independent, accurate location of each cutter.

The external adjusting collar of

each adaptor rests against the machine spindle to assure face squareness and a firm foundation. The collar is slotted radially and clamps an inner core unit in position when a single bolt is tightened. The milling cutter is bolted to the inner core, which is in turn bolted to the spindle. Precision ground and matched threads on the core and in the collar permit axial displacement of the core and cutter—0.125 inch total adjustment—to compensate for cutter wear. Power is transmitted to the cutter through keys located in the core.



Wesson micro-adaptors, visible just back of each milling cutter, accurately locate cutters during setup and compensate for up to four regrinds without resetting of blades.

more production . . .

Two transmission cases are loaded in each pallet-fixture of the Cross Transfermatic and one pair of milling cutters finishes the end faces of each case. Each pallet-fixture includes four gage buttons so that correct axial adjustment of the four cutters can be periodically checked with a feeler gage.

The 34-blade 8-inch diameter cutters have cutting speeds of 300 s.f.p.m. and feed rates of 12.75 i.p.m. Stock removal per blade is 0.0026 inch. The total cycle time for the milling operation is 43 seconds. The 9-inch rapid advance downward is accomplished in 3 seconds. A 7.5-inch feed stroke downward takes 35 seconds. At the end of the milling stroke, the columns retract horizontally away from the workpieces in 1 second and the rapid elevation of the cutters takes 4 seconds. Advancement time for the columns does not add to the cycle because it occurs during pallet transfer.

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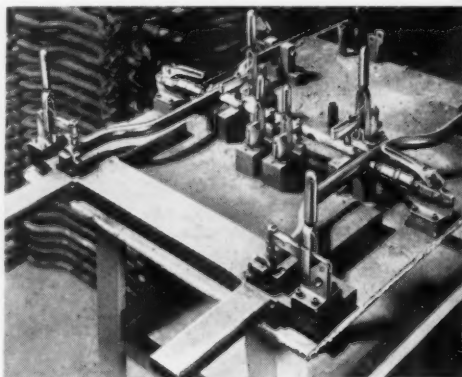
Adjustable Welding Fixture Holds Different Length Legs

An adjustable welding fixture devised at Schieber Manufacturing Company, Detroit, Michigan, supplier of folding tables and benches to the institutional market, has reduced tooling costs for manufacturing folding-table legs. The new design eliminated the need of having separate fixtures for legs of different lengths. Key to the design of the new adjustable fixture is an integrally

H-frame, with end-stops and two De-Sta-Co Series 210 clamps, that slides on ways to suit any length leg required. The clamps were furnished by Detroit Stamping Co., 330 Midland Ave., Detroit 3, Michigan.

The assembly operation starts by locating a hinge-pin (which has been previously welded to a cross-bar) in V-blocks. The cross-bar, with slightly flattened ends, rests on support blocks. Side members of the assembly (the legs) are located from holes drilled near their ends during prior fabrication. The H-frame is then pushed against the opposite ends of the legs to provide a snug fit against end-stops. The legs are locked in position by the toggle clamps on the H-frame.

To assure rigid construction, the cross-bar and legs must be welded together with a solid bead. This requires a tight fit of the side members against the cross-bar before welding. Two De-Sta-Co Model 610



Adjustable welding fixture has a sliding H-frame to accommodate different length legs. Two toggle clamps on H-frame lock legs in position. Four more clamps are provided to lock cross-bar and cross-bar hinge.

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a low cost surface grinder.



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more production . . .

plunger-type clamps, positioned in line with the cross-bar, are used to lock the cross-bar and side-members together.

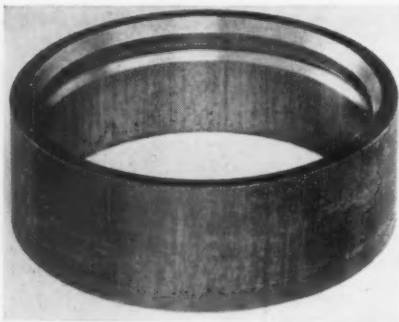
When positioning of the parts has been completed, two more Series 210 clamps are employed to clamp the cross-bar firmly against the support blocks. Also, two Series 207 toggle clamps are used to lock the attached cross-bar hinge-pin in the V-blocks. The assembly is then welded into a single rigid unit.

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Machine Cuts Off, Grooves and Chamfers Cylinders

In making cylinders for hydraulic lifts, such as used on dump trucks, it was necessary to cut the cylinder to length and cut an inside groove and chamfer on one end, concentric with i.d. The cylinders vary



This hydraulic lift cylinder was cut-off to length, grooved and chamfered in a single standard type Modern cutting-off machine.

in diameter from 2 to 6 inches. All of these operations are handled on a standard Modern cutting-off machine equipped with special rear cross slides. Many multiple operations can be handled at one time by this machine, which is a product of Modern Machine Tool Co., 2005 Losey St., Jackson, Michigan.

For more data circle 4 on Postpaid Card

★ modern machine shop ★

Mechanizing Three-Tool Production Line Reduces Costs 87 Percent

A shop-designed adaptation of standard Delta industrial tools at Drain Enterprises, Addison, Ill., has completely mechanized the production of drilled and tapped sink frame lugs. With the functions of three tools—a drill press, a drill press with tapping attachment and a cut-off machine—incorporated into one automatic machine, two men tending five of the machines produce as much as 15 produced previously with individually operated tools. This reduced production costs 87 percent. Each machine drills, taps and cuts off 40 lugs per minute from 24-foot long extrusions.

In addition to producing 15 different style lugs up to 3 inches wide by 1 inch thick for the Hudee watertight sink frame system, Drain Enterprises uses the machines for small parts with tapped holes which are made from steel extrusions and brass rounds.

The three-step operation was made by installing two spindles of 14-inch Delta drill presses, obtained as separate components, on the Delta cut-off machine table and adding a motor

driven cam feed and actuating system. The two drill press spindles are installed on the top of a regular die set block with springs to return spindles after each operation. The tapping spindle is on a spring floating mount which facilitates entrance of the tap in the drilled hole. There is also a spring to return the cut-off machine arm.

The feed mechanism advances the extrusion to a stop at the beginning of each cycle. The cam shaft, driven by a motor reduced to 30 r.p.m., is mounted over the tools in an angle iron frame. The first cam actuates the feed device, the second the drill press spindles, and the third the cut-off machine. The finished part drops through the table to a box

below. One motor, mounted on the angle iron frame behind the tools, drives both spindles from a two-step pulley, the drilling spindle from the larger pulley and the tapping spindle from the smaller to obtain a slower speed.

Precision of the operation depends upon feeding stock against the positive stop, which is readily accomplished with precise extrusions. Tension of the feed cam against the stock is adjusted to account for irregular dimensions in the extrusions. Cams are changed for various size extrusions. Blade size in the cut-off machine may also be changed; three sizes of blades are used; namely, 6, 8 and 10-inch.

For more data circle 5 on Postpaid Card



Mechanized three-tool production line used to produce drilled and tapped sink frame lugs.

more production . . .

Ten Micro-Inch Tracing at Constant Surface Speed

Suppliers of molds to the glass bottle industry have a turning problem. The glassmakers use super-hard materials to resist chemical attack in the bottle-blowing process, but the same materials resist the cutting action of machine tools equally well.

Some moldmakers have been trying to get off the horns of this dilemma by manufacturing short-life parts which are at least machinable, or by trying to bully resistive materials on

lathes with double the weight and horsepower the job ought to call for. Either way, they've usually ended up with high costs and dissatisfaction. Overmyer Mould Company of Winchester, Ind., had another idea, based on experience with mold plungers flame-sprayed with Colmonoy No. 6, a super-refractory, chromium-nickel-boron alloy with a hardness of 57 to 59 on the Rockwell C scale. First, they had been turning the plungers on a large lathe to get enough mass behind the tool for a good surface finish (they wanted under 15 micro-inches r.m.s.), but they realized that the value of the big lathe was being wasted if they could get rigidity—and resulting good surface finish—on a smaller one.

Second, they had tried the whole range of tough tools, including ceramics, and had ended up with cast-iron grade carbide wafers. Colmonoy No. 6, for all its brittle hardness, apparently has qualities akin to cast iron that they hadn't suspected.

Third, this was a tracer job. The small job lots of identical parts and the fine surface finish needed, called for a tracer with unusually sensitive response so that parts could be used as-machined and the lightest possible stylus pressure so that aluminum templates could be used.

Fourth, they'd seen demonstrations of the effect of constant surface cutting speed on the quality of workpiece finish. It appealed as the ideal answer to how to get the same surface finish from beginning to end of the cut on a workpiece of constantly varying diameter.

So Overmyer Mould Company went looking for the ideal lathe—tracer—constant speed cutting tool

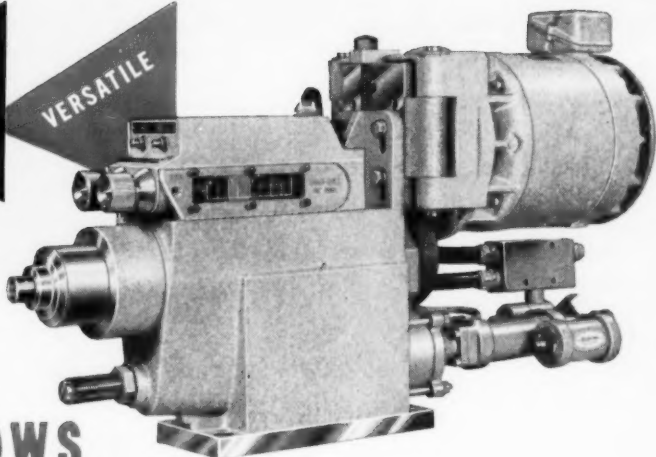


Cutting hard-surfaced mold plungers in a LeBlond Dual-Drive Lathe at Overmyer Mould Co., Winchester, Ind. Dial on top of headstock shows operator that surface of workpiece is meeting cutting tool at constant speed, resulting in a mirror-smooth surface.

ACCURATE

FAST

VERSATILE



BELLOWS "Carbi-Drill" DRILL UNIT

- Runout not over .001" T.I.R. in full 4" stroke.
- Capacity to 5/8" drill in mild steel.
- Spindle speeds available from 609 RPM to 6275 RPM.
- Depth Accuracy .003" with standard limit switch; .001" with optional Bellows BT-1 Timed Dwell Control.

The rugged, heavy-duty "Carbi-Drill" is ideal for use in toolroom-built special-purpose machinery for high speed precision drilling, tapping, reaming, counterboring, etc. Extremely versatile. "Carbi-Drill" units can be mounted in any position, are easily synchronized with each other or with other "Controlled-Air-Power" Devices for fully automatic operation. Air powered rapid advance and retract, hydraulic feed rate adjustable for any tool working in any material.

1342 B-3

Free Bulletin CD-60 gives complete information and specifications. Write for your copy today. Address Dept. MMS, 860, Bellows-Valvair, Akron 9, Ohio.

Bellows-Valvair

The Bellows Co. • Valvair Corp. Akron 9, Ohio
DIVISIONS OF INTERNATIONAL BASIC ECONOMY CORPORATION (IBEC)

For more data circle 398 on Postpaid Card

August, 1960

MODERN MACHINE SHOP 143

more production . . .

combination. If you step into Overmyer's Winchester plant today you'll see two 15-inch LeBlond Dual-Drive Lathes lined up neatly in the same amount of space the previous lathe occupied. Besides being smaller and newer, the Dual-Drives are also lighter than the old lathe, but they have all the horsepower and rigidity the job requires due to good design rather than sheer beef.

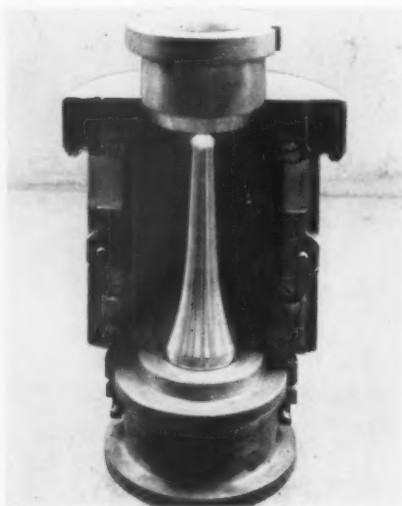
One lathe is turning out Colmonoy-coated plungers, hour after hour, with a mirror 8 to 12 micro-inch finish. The other lathe speeds production by turning out parts which mate with the plungers.

The LeBlond tracers, with their

super-sensitive, stepless response, are ideally suited for turning jobs like the mold plunger. Their low stylus pressure permits them to use easily made aluminum templates only 1/32 inch thick. They follow the contour so smoothly that the effect is of a ground and polished rather than as-turned surface.

The LeBlond Dual-Drives (so called because they employ belt drive in the higher speed ranges) are equipped with Dynamatic variable speed drives which maintain constant speed of the workpiece surface at the cutting tool point through a wide range of spindle speeds. Speed changing as the tool moves from smallest to largest diameter is accomplished without interrupting the cut.

For more data circle 6 on Postpaid Card



Plunger forms a molten glass glob into a "parison"—a hollow shape which will then be expanded by blowing into the final bottle mold. Bottleneck is at the bottom of this first-stage bottle mold. Plunger must withstand glass temperature of 1700 deg. F.



In this illustration, the grainy surface of a Colmonoy-sprayed plunger contrasts strongly with machined parts. Machined surface, with 8 to 12 micro-inch finish is said to be fine enough to use as machined—just as these particular parts appear in the illustration.

LOOK FOR THESE TRADEMARKS



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If you're looking for as fine a blade as money can buy . . . specify the Nicholson or Black Diamond trademark. They're among the best respected brands in the metal-working industry.

Here's part of the reason why . . . we make our blades from the finest available steel, according to the latest manufacturing methods. We inspect them again and again. We approve only those blades that meet our high standards.

More important, you can be confident that you're getting quality blades to produce quality work.

A good many industrial blade users and buyers are switching to the Nicholson and Black Diamond brands. The best gauge of the way they like them is the way they keep reordering them. The next time you need blades . . . order the Nicholson or Black Diamond brand. You'll be specifying the economy of top quality.

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Ideas from readers

Several time-saving ideas and suggestions for the man in the machine shop.

Quick Method for Centering Work in a Steady Rest

By CLINT McLAUGHLIN

The normal procedure followed in setting up a shaft in the steady rest of a lathe is a time-consuming one. To simplify this task, we first mounted the steady rest on

the lathe and then scribed a circle on the face of the steady rest concentric with the lathe center line. Next, we drilled and reamed three $\frac{1}{4}$ -inch holes on this circle in such a way that one hole was located near each clamping jaw of the steady rest. We then turned shoulder pins and pressed them into the three holes, after which we placed an accurate mandrel on the lathe centers and measured over the mandrel and over each pin. Any variation in these dimensions was corrected by turning down the pins.

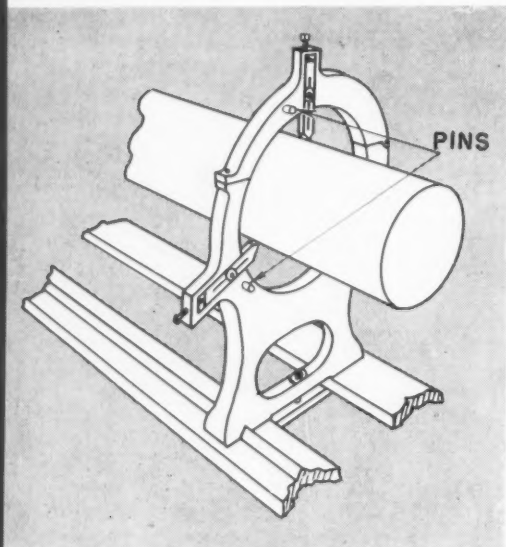
Now when we locate a shaft in the steady rest, we can quickly and accurately center it with the aid of the pins. We either measure over each pin and the shaft or we use an indicator on a surface gage. The steady rest is adjusted until all readings are equal.

★ modern machine shop ★

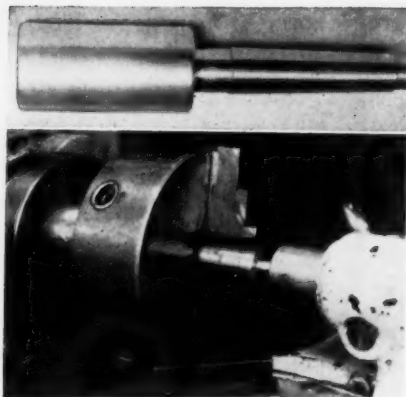
Tail Spindle Adaptor Supports Lathe Chuck for Safe Removal

By IRA S. ROBERTS

A simple plug adaptor, with taper shank to fit the tail spindle of an engine lathe, as shown herewith,



Pins provided in face of steady rest allow for quickly locating shaft in steady rest.



Simple plug adaptor (above) allows for safe removal of chuck from lathe spindle (below).

serves as an effective aid for the safe removal of a lathe chuck. The adaptor is intended for use on lathes equipped with standard externally keyed taper spindles. This latter type of chuck mounting often permits heavy chucks to fall onto the lathe bed when being removed because the operator's hands are occupied in releasing the locking ring which holds the chuck to the spindle nose. With the chuck jaws tightened on the adaptor, the ring can be freed, the tail spindle retracted to carry the chuck off the spindle nose and then the operator loosens the jaws and lifts the chuck with a firm grip in both hands.

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Felt on Blanking Die Prevents Scratching of Soft Stock

By H. J. GERBER

We have a punch press job which involves the blanking of five-inch discs from 16 gauge, 2-SO

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HOGGSON & PETTIS MFG. CO.,

New Haven 7, Conn.

For more data circle 400 on Postpaid Card

MODERN MACHINE SHOP 147

ideas from readers . . .



Thin layer of felt applied to blanking die prevents scratching of soft metal stock.

aluminum sheet stock. The discs, which are to be drawn into a shallow

cup shape, must be absolutely free from surface damage in order to be usable. It was found that scratches and rub marks were appearing on the finished cups and the trouble was traced back to the blanking die. Careful removal of all sharp edges on the stripper plate and all apparent roughness on both the die face and under side of the stripper failed to cure the trouble. The condition was finally eliminated by cementing a thin layer of felt to the punch face, surface of the die, and the underside of the stripper.

The felt also served another purpose. We had been swabbing the stock with lubricant as it was fed and found that the felt assisted greatly in wiping the oil uniformly over the work before being blanked.

THE ALL-IMPORTANT DETAIL

A VIMCO LIGHT ON THE JOB

UL LISTED

Vimco lights can bring light to the toughest places, yet never get in the way. A flexible steel arm allows for easy adjustment without resetting, holds lamp firmly in position. The result: better lighting, fewer rejects.

IN THE BEST COMPANY

Pictured at right is the Pioneer Paper Drill, made by the Pioneer-Toledo Corp., with Vimco Light.

VIMCO MFG. CO. INC. • Holland, N. Y.

Circle 401 on postpaid card for more information about economical, on-the-job lighting.



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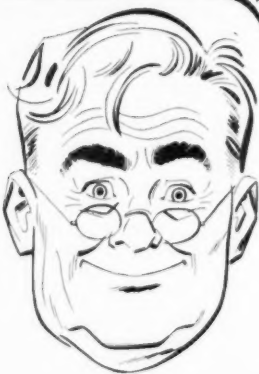
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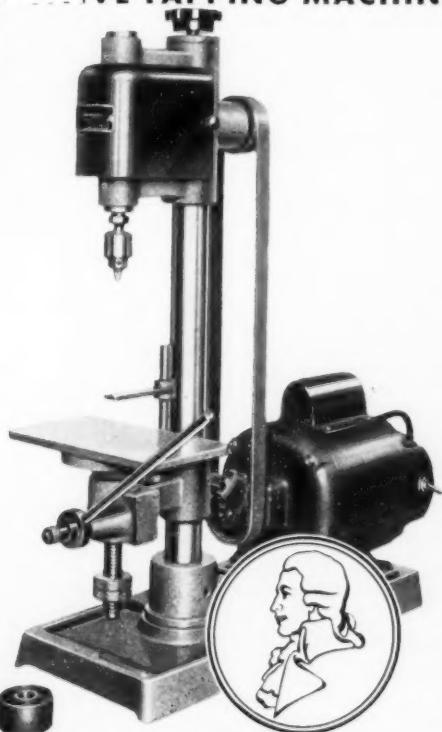
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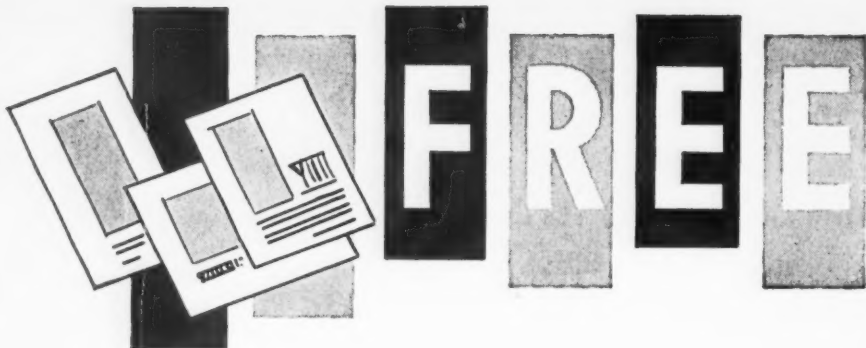


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Use Postpaid Cards opposite Page 32 and Inside Back Cover for requesting free copies of literature listed below.

Shop and Cutting Tools and Gages

Karl A. Neise, Inc., Department MM, 404 Fourth Ave., New York 16, N. Y. Extensive Modern Tools Red Catalog provides detailed information and illustrations on such tools as: dividing heads, drilling fixtures, rotary tables, facing and boring heads, fly cutters, vises, gripping claws, step blocks, toolholders, calipers, vernier depth gages, dial depth gages, vernier height gages, telescoping gages, small hole gages, radius gage sets, protractors and comparator gages. For more data circle 7 on Postpaid Card

Drill Unit

The Hartford Special Machinery Co., 3700 Homestead Ave., Hartford 12, Conn. This fully illustrated, six page brochure presents the Model 17-400 Air Hydraulic Drilling Unit, which was designed as a building block component for assembly into automatic machines. For more data circle 8 on Postpaid Card

Punch Press Feeds

Mechanical Tool and Engineering Co., 2323 Twenty-Third Ave., Rockford, Ill. Four page, color bulletin presents Rapid-Air Precision Punch Press Feeds, which have been designed with a new outlook on the results that can be obtained with an air feed. These units are self-contained, compact, air operated and easy to set up. For more data circle 9 on Postpaid Card

Drill Press Safety Guide

The McGonegal Manufacturing Co., 135 Mozart St., East Rutherford, N. J. Bulletin presents the Themac Drill Press Safety Guides, which prevent the common drill press accidents and safely hold work with or without jigs. Several application photos are shown, along with the features of these tools.

For more data circle 10 on Postpaid Card

Benders

MacIodyne Corp., Curvit Division, 19 Grosvenor Ave., East Providence, R. I. Bulletin on the Series B Curvit Benders for bending bars, pipe or tubing through 1 1/4 inches in diameter. The B Series is made in five models, which are listed. The three smaller are sprocket chain drive and the two larger are rack and pinion. All have either a four place turret stop or a single stop with gage and handwheel adjustment.

For more data circle 11 on Postpaid Card

Diamond Wheels and Tools

Delta Diamond Wheel Corp., 1403 Utica Ave., Brooklyn 3, N. Y. Catalog No. 720 lists standard types of Delta Metal and Resin Bonded Diamond Wheels and Tools in either man-made or natural diamonds. Other items include diamond hones, mounted points, diamond dressers, diamond saws and diamond core drills.

For more data circle 12 on Postpaid Card



LITERATURE

Liquid Cleaner

Kelite Corp., 81 Industrial Road, Berkeley Heights, N. J. Kelite Formula 28 Bulletin P-12591MX describes how Kelite Formula 28 removes grease, oil, ink, soot, dirt, light carbon and similar deposits from hard surfaces without heat, fumes or fire hazard. This multi-purpose liquid cleaner can be used safely at room temperature by spray, wipe-on or immersion methods, on commonly used metals, plastics, Plexiglass, rubber, porcelain, wood and painted surfaces.

For more data circle 13 on Postpaid Card

High Speed Grinder

R. G. Haskins Co., 2649 West Harrison St., Chicago 12, Ill. Four page, color bulletin on the VB 2 High Speed Grinder, which is a compact, convenient flexible shaft machine which has the speed and power to operate small grinding wheels at efficient r.p.m. Accessories are also presented.

For more data circle 14 on Postpaid Card

Automatic Turret Lathe

Pratt and Whitney Co., Inc., 25 Charter Oak Boulevard, West Hartford, Conn. This attractive, color bulletin presents the Potter and Johnston 3E-15 Automatic Turret Lathe. Features, specifications, illustrations and data on attachments and tooling are shown.

For more data circle 15 on Postpaid Card

Chipbreaker

Chicago Heights Steel Co., Speedicut Division, Chicago Heights, Ill. Literature on the Speedicut "Chipbreaker," which features high feed rates and more holes drilled per regrind. This tool was designed to cut drilling costs and increase production.

For more data circle 16 on Postpaid Card

Hydraulic Valves

Rivett, Inc., Department MMS-7, Brighton 35, Boston, Mass. Catalog Section 230 is a 20 page, color catalog about Rivett Pressure Controlled Hydraulic Valves. Sections are included on the following: multiple function, how to select valves, valve models, valve size, types of mounting, model selection chart —JIC symbols, dimension drawings, ordering instructions, items furnished with valves, Rivett complete line and Rivett distributors.

For more data circle 17 on Postpaid Card

Inspection Instrument

Indi-Square Co., 1119 East Ridge Road, Rochester 21, N. Y. The Indi-Square eliminates time consuming effort and uncertainty of inspection and setup for squareness. It can be used for tool inspection, toolroom setup, parts inspection, quality control, gage making and inspection, machine setup and inspection, setup and inspection for the machine tool industry.

For more data circle 18 on Postpaid Card

Hoists, Trolleys and Cranes

American Chain and Cable Co., Inc., Wright Hoist Division, York, Pa. Information-packed eight page folder—Bulletin DH-28-A—describes the extensive Wright line of Frame 1, 1½, 2 and 3 motor operated hoists and trolleys, electric chain hoists, hand operated hoists, Pull-A-Way units, army type trolley hoists, jib crane, hand traveling cranes and motor driven cranes. The bulletin contains data on general features of all units and components, mountings, specs, weights, dimensions, suspensions, clearances, headroom, accessibility, lifting capacities and other information.

For more data circle 19 on Postpaid Card

free literature . . .

Grinding Wheels

Norton Co., Worcester 6, Mass. Form No. 1724 is a new booklet, entitled "Grinding Wheels for the Welding Trade." Each type of grinding wheel used in this field is described as to its uses and properties. Photos and tables amplify the text to help the user determine the correct wheel for every job. A net price supplement is included in the booklet.

For more data circle 20 on Postpaid Card

Valves

Airmatic Valve, Inc., 7313 Associate Ave., Cleveland 9, Ohio. 20 page, profusely illustrated Bulletin 91024 describes two, three and four way electrically operated valves. This bulletin supplies descriptions, specs, outstanding features, flow charts, optional features, ordering data and dimensions.

For more data circle 21 on Postpaid Card

Pressure Indicator

Barber-Colman Co., Wheelco Instruments Division, 64 Loomis St., Rockford, Ill. Bulletin F-9951 presents the Wheelco 400 Series Pressure Indicator, which incorporates a measuring system and d.c. power supply in a single integral unit. Other Wheelco instruments for process control applications are also described and illustrated.

For more data circle 22 on Postpaid Card

Furnace

Sunbeam Equipment Corp., 180 Mercer St., Meadville, Pa. Bulletin SEC-9 presents the Sunbeam Automatic Casemaster Furnace for carburizing, carbonitriding, carbon restoration, normalizing, annealing and hardening up to 1,850 degrees Fahrenheit.

For more data circle 23 on Postpaid Card

Plug and

Ring Gages

Lincoln Gage Co., 23900 Harper Ave., St. Clair Shores, Mich. Data sheet on Lincoln Plug and Ring Gages, Taperlock and Reversible Cylindrical Plug Gages and Cylindrical Ring Gages.

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Drill Presses

Rockwell Manufacturing Co., Delta Power Tool Division, 606-G North Lexington Ave., Pittsburgh 8, Pa. The new line of Delta 20 inch power feed drill presses is described in this 12 page, three color catalog (Bulletin 100M).

For more data circle 25 on Postpaid Card

Punches

The Product Machine Co., Ring Punch and Die Division, Jamestown, N. Y. The Punch Line, a new, four page bulletin, features a new Pull-Pin Ejector Punch. This punch permits rapid removal of the ejector pin for point sharpening. Also illustrated are three point lengths in ring and head type round punches, new stripper bushings and three styles of quill punches.

For more data circle 26 on Postpaid Card

Milling Machine

Northern Illinois Machinists, Crystal Lake Road, McHenry, Ill. Bulletin presents the Model 624 Hydromill Hydraulic Feed Milling Machine. Ten outstanding features are given, along with illustrations and specifications.

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Welding Equipment

Linde Company Division, Union Carbide Corp., 270 Park Ave., New York 17, N. Y. 16 page Sigmatic Manual Welding Equipment Catalog — F-1393 — describes the Sigmatic line of welding machines, plus torches and controls, for consumable electrode, inert-gas-shielded welding.

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Measuring Wheel

The Lufkin Rule Co., Saginaw, Mich. Pamphlet on the Lufkin 202 Measuring Wheel for quick, easy measurement over relatively smooth surfaces.

For more data circle 29 on Postpaid Card

Burnishing Tool

Madison-Faessler Tool Co., Post Office Box 1137, Providence, R. I. Six page, color brochure on the Microller Burnishing Tool. There is an adjustable Microller in a standard size for any bore diameter from 0.187 to 8.000.

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HAND OPERATED DETAIL PRESS

for Nameplates and Small Parts

CHARACTER SIZE
1/16" to 1/4"

NEW

Top Quality detail press for low cost name plate and small part stamping. Features automatic spacing of work, delivers up to 2 tons pressure. Marks hard materials like stainless steel.

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Automatic Roll Feeds

Roll Feeds Corp., Ashton, R. I. New brochure contains 39 standard feeds, which are applicable to all metals, felt, cardboard, plastics, paper, wire and rubber in all widths, lengths and thicknesses. RFC Automatic Roll Feeds control feeding to utmost accuracy without pilots or finger stops.

For more data circle 31 on Postpaid Card

Hole Location Gage

Mayes Tool Co., 26514 West Seven Mile Road, Detroit 40, Mich. Hole locating and concentricity gages are shown in a new, eight page Con-Chek Gage bulletin. Special Mayes Tool Gages using Con-Chek Gages for checking multiple holes in parts, are also shown.

For more data circle 32 on Postpaid Card

Precision Lathes

Sheldon Machine Co., Inc., 4250 North Knox Ave., Chicago 41, Ill. Four page, color brochure on Sheldon Variable Speed Precision Lathes. This is a series of 11 and 13 inch precision lathes with tool-room accuracy, spindle speeds to 2,000 r.p.m., instant horsepower to the spindle and a full range of toolroom and production accessories to provide greater versatility.

For more data circle 33 on Postpaid Card

End Mills

Wesson Co., 1220 Woodward Heights Boulevard, Ferndale 20, Mich. 12 page Bulletin MF-360 describes carbide tipped shell end mills, straight and taper shank end mills and reamers, core drills, lathe centers and, also, counterbores.

For more data circle 34 on Postpaid Card

Gage Blocks

Inspection Control Corp., Lake City, Mich. Four page, color brochure on the company's line of gage blocks. Price information is included, as well as data on the Stair Check for surface plate checking.

For more data circle 35 on Postpaid Card

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**ENFORCING
FINISH
"SPECS"**



...with the
BRUSH

Surfindicator!

- ✓ MEASURES ANY FINISH
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Chip Handling System

Link-Belt Co., Department PR, Prudential Plaza, Chicago 1, Ill. 12 page Book 2926 describes metal chip handling systems for automatic, continuous crushing and deooling of metal chips and turnings. For more data circle 36 on Postpaid Card

Cutting Tools

Brown and Sharpe Manufacturing Co., Cutting Tool Division, Providence 1, R. I. General Catalog No. 38 contains detailed information on high speed steel and carbide end mills and high speed steel and carbide milling cutters. For each tool, this data is offered: tool design, tool tolerances, tool features, materials to cut, production uses and dimensional drawings. In addition, there are sections to help the user buy special tools, sections on speeds and feeds, tool selection tables and engineering data on resharpening most tools. For more data circle 37 on Postpaid Card

Pneumatic Riveters

Lemert Engineering Co., Inc., Plymouth, Ind. Four page, color Bulletin No. 74B presents the Airflex Pneumatic Riveters with rotating impact.

For more data circle 38 on Postpaid Card

Motor Selector

Howell Electric Motors Co., Howell, Mich. Motor Selector L-1661A lists in brief, easy to use arrangement, a quick reference to the complete motor and generator lines available. For more data circle 39 on Postpaid Card

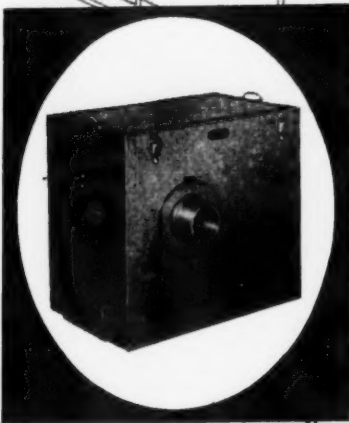
Diamond Wheels

Diamond Tool Research Co., Inc., 380 Second Ave., New York 10, N. Y. This large and extensive catalog covers diamond wheels, hones and mandrels. For all wheels where natural diamonds are requested, DTR will use its pressure tested diamond grits at no extra cost to the user. For synthetic or man-made diamond wheels, newly developed bonds are featured. A unique pricing system is inaugurated, which will make possible savings for the purchaser.

For more data circle 40 on Postpaid Card

DUSTKOP "520"

designed to collect dust from
single machines



portable —
easily installed

**DUSTKOP
STOPS DUST**

Self-contained Dustkop models like the "520," are practical and effective in collecting dust from single machines. They're designed specifically for service with surface grinders, tool and cutter grinders, offhand grinders, buffers and other small wheel equipment.

These units are also easy to install — are actually portable — and very economical to operate.

Write for illustrated literature

46 models to choose from!

NEW DUSTKOP AUTO SHAKER
shakes filters AUTOMATICALLY

AGET manufacturing company
1398 E. Church Street, Adrian, Michigan

For more data circle 406 on Postpaid Card

ask for
details

free literature . . .

Precision Boring Machine

Jones and Lamson Machine Co., Thread Tool Division, 521 Clinton St., Springfield, Vt. Six page, color brochure on the J and L Precision Boring Machine, that turns, bores and faces with great accuracy at low cost. Specific job problems are presented, along with individual solutions.

For more data circle 41 on Postpaid Card

Exalene Gas Producers

General Electric Co., Schenectady 5, N. Y. Four page bulletin—GED-3995—lists features and advantages of General Electric exalene (exothermic) gas producers for bright annealing, normalizing, brazing and sintering of low carbon steels, brass and copper.

For more data circle 42 on Postpaid Card

Welding Platens

Acorn Iron and Supply Co., Delaware Ave. and Poplar St., Philadelphia 23, Pa. This bulletin illustrates typical welding

operations on the company's platens, which resist heat and weld drippings and prevent warpage and distortion. These layout and setup blocks or welding platens, tools and accessories were designed for research, design and development in electronics, aircraft, missiles, metal fabrication, maintenance and plant engineering.

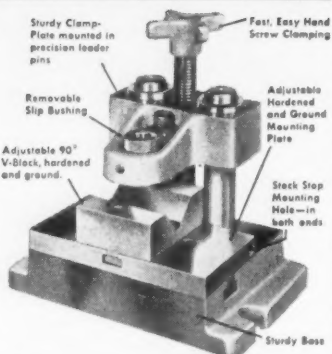
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REPCO Time-Saving Tools

ADJUSTABLE V-BLOCK DRILL JIG

Saves Set-Up Time—
Increases Output

Here is a versatile and accurate V-Block that makes center and off-center drilling, tapping, and reaming easy and precise. Four-way V-block adjustment simplifies handling a wide range of work. Fast, easy positioning and clamping speed production. A centering locator plug and T-slots in the mounting surface plates assure fast, easy, on-center adjustment. Drill capacity $\frac{1}{8}$ to $\frac{1}{4}$ inch diameter. Handles stock from $\frac{1}{4}$ to 2 inch diameter.



TRUE-CENTER ADJUSTABLE TOOL HOLDER



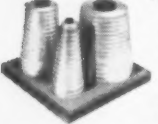
The REPCO Adjustable Holder is a precision-built tool, having two-piece construction which provides fast adjustment to compensate for as much as $\frac{1}{32}$ inch machine misalignment. Cuts down on tool wear, breakage, and scrap.

TWO-PIECE VISE SET



Save time with this versatile 2-Piece Machine Vise Set. Use as general-purpose vise, angle-block, or separate clamping device. Opening limited only to length of machine base. Light, accurate, rigid. Two sizes: 6" and 8".

CHUCK JAW TRUING-RING SET



This Ring Set saves time, cuts cost of boring jaws. With correct diameter rings at hand, you gain hours of productive time. Plated rings range from 1" to 4" by $\frac{1}{16}$ inch increments. Handy peg-type rack keeps rings in place.

COMBINATION LIVE-CENTER SET



Heavy-duty live-center plus six interchangeable adapters, ranging from a point to $\frac{6}{16}$ inch dia. ball. Saves costly set-up and machining time necessary to make large-diameter centers. Straight and various taper shanks available.



Write for complete information—Exclusive agent territories open.

ROCKFORD ENGINEERED PRODUCTS CO.

23rd Avenue and 20th St. • Rockford, Illinois

For more data circle 407 on Postpaid Card

Notching Tool

Vogel Tool and Die Corp., 1823 North 32nd Ave., Stone Park, Ill. Four page, color bulletin on The Arc-Fit, which prepares the end of a tube with two strokes of the press — both notches in five seconds.

For more data circle 44 on Postpaid Card

Toggle Clamps

Wolverine Tool Co., 1486 East Woodbridge, Detroit 7, Mich. Bulletin on the new C-150 Series of square plunger, push action toggle clamps.

For more data circle 45 on Postpaid Card

Cup Packings

E. F. Houghton and Co., 303 West Lehigh Ave., Philadelphia 33, Pa. Four page folder describes the properties and characteristics of Rex-Syn Cup Packings. It gives the standard sizes of Rex-Syn and outlines the results of several field tests. For more data circle 46 on Postpaid Card

Jig Borers

Moore Special Tool Co., Inc., 800 Union Ave., Bridgeport 7, Conn. A check list of ten vital factors to be considered by prospective purchasers of jig borers, which will help simplify the ordinarily complex job of evaluating this type of equipment, is available. This check list, in the form of a four page folder, describes with photos and drawings the important attributes of a good jig borer. For more data circle 47 on Postpaid Card

Roundness Gage

Cleveland Instrument Co., 6220 East Schaaf Road, Cleveland 31, Ohio. Flyer on the Ind-Ron Ultra Precision Roundness, Concentricity and Squareness Gage. For more data circle 48 on Postpaid Card

Torque Selector

Olme Precision, Inc., Portsmouth, Ohio. Four page folder on the Power-Max, which reduces power consumption, size and cost of motors and starting equipment, maintenance on motors and machines and it also prevents damage of the product. For more data circle 49 on Postpaid Card

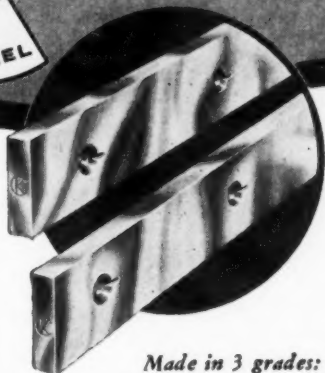
Machine Tool Leasing Plan

The American Tool Works Co., Pearl St. at Eggleston Ave., Cincinnati 2, Ohio. Bulletin 801 is entitled "Toolease . . . A Powerful New Profit Tool For Your Key Men." It describes, in easy to understand language, The American Tool Works Company leasing arrangement. Known as "Toolease," this true lease plan features several advantages, including low bank rate finance charges and no security deposits or down payment of any kind.

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SOLID
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Made in 3 grades:

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Used by practically EVERY manufacturer of squaring shears as original equipment. Because they are ground to the closest tolerances in the knife industry — "CLEVELAND" shear blades insure maximum cutting life . . .

We make a complete line of knives and shear blades for every industrial need. We have learned a lot about YOUR problems in the past 40 years — ask us.

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Welding Equipment

Wall Colmonoy Corp., 19345 John R St., Detroit 3, Mich. Illustrated, four page bulletin (Form 300D) describes the Model D Spraywelder. The bulletin gives a thorough description of the Spraywelder unit and lists its advantages. It also contains a step-by-step outline discussion of the Colmonoy Sprayweld Process.
For more data circle 51 on Postpaid Card

Packaging Machine

Sundstrand Corp., Sundstrand-American Broach Division, Ann Arbor, Mich. Six page, color brochure presents the Sundstrand Packmaster, Model 50A, which automatically packages hard and soft goods at rates up to 150 per minute.
For more data circle 52 on Postpaid Card

Mist Coolant Equipment

Bijur Lubricating Corp., Rochelle Park, N. J. Application methods for a variety of standard machining operations are

both shown and explained in a six page, gate fold booklet. Using the firm's Spraymist engineered mist coolant equipment, the booklet covers a pplication methods for: end milling, face slab and side milling, tapping, tool and cutter grinding, surface grinding, boring - rotating and stationary tool, turning, drilling - reaming, internal grinding and sawing.

For more data circle 53 on Postpaid Card

Drill Grinder

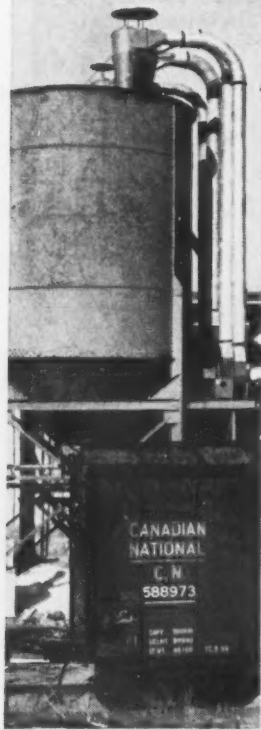
Union Twist Drill Co., Athol, Mass. Four page, color brochure on the Multi-Point Drill Grinder, designed and developed to perform rapidly and economically the following basic operations: grind 118 degree points, grind 135 degree points, grind (crankshaft) split points, web thinning and reducing drill lip rake.

For more data circle 54 on Postpaid Card

Cylinders

Flick-Reedy Corp., Miller Fluid Power

"TORIT'S dust control system solved our housekeeping problem"



That's the opinion of Mr. Robert Flaughner, plant engineer at Richards-Wilcox Mfg. Co., who recently installed a Torit flexible system for dust collection in their new woodworking department. Richards-Wilcox, in Aurora, Illinois, is one of the country's largest firedoor and partition door manufacturers.

Mr. Flaughner was also impressed with the other results of Torit's efficiency in removing up to 98% by weight of wood dust, chips, and shavings. "Employee morale was increased noticeably by cleanliness at the plant. Machine downtime is already lower. And the long range effect on the health of both men and machines is bound to be beneficial."

Four Torit centrifugal separators, models #30 and #36, were installed. The flexibility of the system allows individual machine shutoff. Also capacity of system can be increased approximately 25% with nominal cost.

Whatever your dust problem is, there's a Torit system to handle it, efficiently and economically. Your Torit representative can hardly wait to supply all the proof you want.

Just write to:

TORIT MANUFACTURING CO.

1133 Rankin Street, St. Paul 16, Minnesota, Dept. 726

For more data circle 409 on Postpaid Card

Division, 7N023 York Road, Bensenville, Ill. Pricing Booklet, containing 12 pages, gives detailed prices on Miller Air Cylinders, Job Rated Hydraulic Cylinders, Power Packed Hydraulic Cylinders, Counterbalance Air Cylinders, Air-Hydraulic Boosters, Cylinder Accessories and Optional Cylinder Components.

For more data circle 55 on Postpaid Card

Duplicating Service

Dayton Rogers Manufacturing Co., 2824 Thirteenth Ave., South, Minneapolis 7, Minn. Flyer describes Dayton Rogers' photomechanical duplicating, which turns out any desired quantity of parts to close tolerances and free of burrs without the use of dies or stamping equipment. By this process of photographic reproduction it is possible to produce many intricate shapes at an unusually low first cost.

For more data circle 56 on Postpaid Card

Tool Steel

The Uddeholm Company of America, Inc., 155 East 44th St., New York 17, N. Y. Eight page pamphlet on UHB 19-VA, which is a water hardening vanadium alloyed tool steel, specifically developed for the cold heading industry.

For more data circle 57 on Postpaid Card

Internal Grinder

Bryant Chucking Grinder Co., Springfield, Vt. Six page, illustrated brochure on the Bryant Miniature Model B Centalign Internal Grinding Machine.

For more data circle 58 on Postpaid Card

End Mills and Milling Cutters

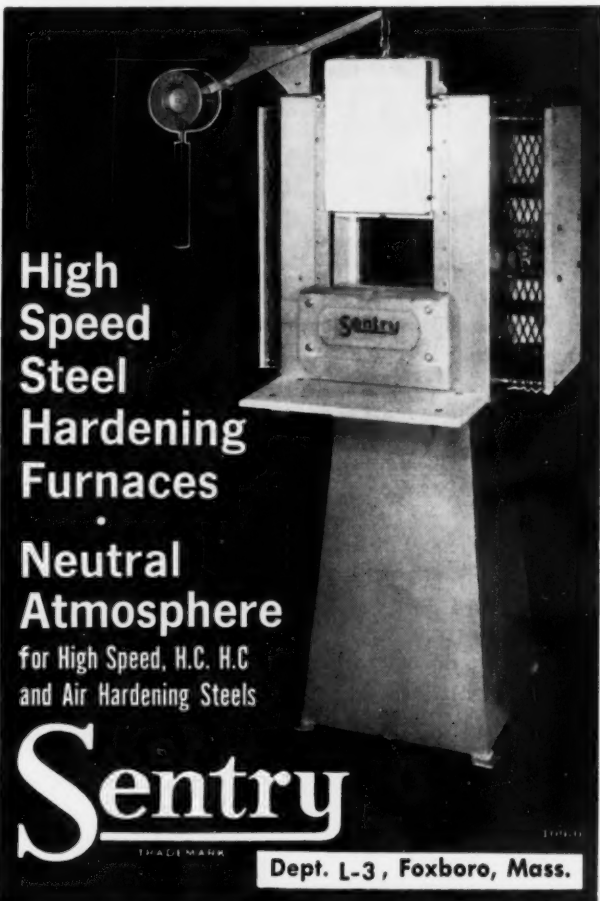
The Cleveland Twist Drill Co., Post Office Box 6656, Cleveland 1, Ohio. Helpful, 64 page book gives data on the expanded line of Cleveland End Mills and the new Cleveland Milling Cutters.

For more data circle 59 on Postpaid Card

Variable Speed Drives

Zero-Max Co., 1936 Lyndale Ave., South, Minneapolis 5, Minn. 16 page, two color catalog of stepless variable speed drives for fractional horsepower applications.

For more data circle 60 on Postpaid Card



**High
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Steel
Hardening
Furnaces**

**Neutral
Atmosphere**

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and Air Hardening Steels

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Dept. L-3, Foxboro, Mass.

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Jig Boring Machine

Linley Brothers Co., 661 State St. Extension, Bridgeport 1, Conn. Six page, color bulletin on the improved Linley Jig Borer, which features flexibility, simplicity and versatility plus toolroom precision. Descriptive matter, photos and features are presented, along with numerous accessories which are available for use with the Linley Jig Borer. For more data circle 61 on Postpaid Card

Drill Jig Bushings

American Drill Bushing Co., 5107 Pacific Boulevard, Los Angeles 58, Calif. Complete price list of American Thinwall Drill Jig Bushings, American Standard. For more data circle 62 on Postpaid Card

Height Gage

United States Chemical Milling Corp., 1700 Rosecrans Ave., Manhattan Beach, Calif. Brochure describes the Height Master, an entirely new concept in height gages. Featuring many illustrations of the portable Height Master

and its accessories, the booklet describes in detail the new gage, which is specifically designed for use in inspection, precision layout work and checking jigs and fixtures. For more data circle 63 on Postpaid Card

Saw Blades

Nicholson File Co., Providence 1, R. I. "Sawology," a Nicholson File Company Handbook, is a treatise on the selection and use of hack saw blades for the cutting of ferrous and non-ferrous metals, hard plastics and rubber, wood and other dense materials. This will be a useful guide for the purchasing agent, shop superintendent, production foreman, mechanic and supervisor of tool cribs.

For more data circle 64 on Postpaid Card

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Toolholders

Kennametal, Inc., Latrobe, Pa. Dial-A-Breaker Kendex Tool specifications are contained in this two page catalog supple-

ment, covering 76 tools. Supplement 10A is available with an announcement sheet that illustrates the fine screw-adjustment feature of attached chipbreakers, as provided by an easily accessible thumb dial.

For more data circle 65 on Postpaid Card

Broaches and Fixtures

National Broach and Machine Co., 5600 St. Jean, Detroit 13, Mich. 12 page, two color profusely illustrated catalog—B60-4—describes Red Ring Broaches and Broaching Fixtures. The catalog discusses the seven factors that are essential in a broaching tool and describes a wide variety of high speed steel and carbide broaches for holes, splines, irregular surfaces, flat surfaces, keyways and, also, serrations.

For more data circle 66 on Postpaid Card

Bending Machines

W V Industries, Post Office Box 222, Hawthorne, N. J. Four page Catalog No. VW60 describes and illustrates precision metal bending machines, both power and hand operated.

For more data circle 67 on Postpaid Card

Pipe Tools

Beaver Pipe Tools, Inc., Dana Ave., Warren, Ohio. Catalog No. 60 includes data on such items as threaders, threading oil, pipe machines, chucks, pipe machine dies and accessories, drive shafts, pipe supports, pipe reamers, pipe cutters, geared cutters, groovers, bevelers and cutter wheels.

For more data circle 68 on Postpaid Card

Micrometers

J. T. Slocumb Co., 68 Matson Hill Road, South Glastonbury, Conn. One page, two color, fully illustrated sheet on "How to Read a Micrometer." Literature describes the micrometer's principle of operation, how to read graduations and caliper on a conventional micrometer from thousandths to ten-thousandths inch. The back page of the sheet graphically illustrates three examples on calculating reading.

For more data circle 69 on Postpaid Card



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DETAILED, WELL ILLUSTRATED,
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IT INCLUDES LOW REGRINDING PRICES

YES, A SEVERANCE MIDGET MILL MAY WELL SOLVE YOUR PROBLEM AND SAVE YOU MONEY, IF YOU MUST REMOVE GATES, FINIS, AND RISERS; BREAK SHARP CORNERS AND EDGES; MACHINE CARBON; FINISH CASTINGS OF ANY MATERIAL; WORK FILLETS, RADII, AND GROOVES; DEBURR OIL HOLES; BLEND WELDED AND ASSEMBLED PARTS; REMOVE FLASH; SMOOTH WELD BEADS; OR ANY OTHER SIMILAR OPERATIONS



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SEVERANCE MIDGET MILL SET NO. 77 IS A POPULAR SET OF 1/2" DIAMETER, 1/4" SHANK, HIGH SPEED MIDGET MILLS. MAKES A FINE GET-ACQUAINTED SET AND WILL COVER A BIG MAJORITY OF YOUR NEEDS FOR THIS TYPE TOOL. LEAFLET NO. 651 GIVES DETAILED INFORMATION AND PRICES. **ASK FOR IT TODAY!**

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& BORE-MILLS



BALL SEAT
REAMERS

For more data circle 412 on Postpaid Card

August, 1960

MODERN MACHINE SHOP

161

free literature . . .

Gears and Gear Boxes

The Cincinnati Gear Co., Wooster Pike and Mariemont Ave., Cincinnati 27, Ohio. A 32 page brochure on custom gears and custom gear boxes provides information on facilities for precision manufacture and inspection of made to order gearing. It contains many pages of technical material useful to engineers and production management.

For more data circle 70 on Postpaid Card

Sawing and Filing Machines

International Machine and Tool Corp., 101 Venturi Ave., Warwick 5, Rhode Island. Four page, color bulletin presents heavy duty filing and sawing machines for economical production of punching and stamping tools, openings and so on.

For more data circle 71 on Postpaid Card

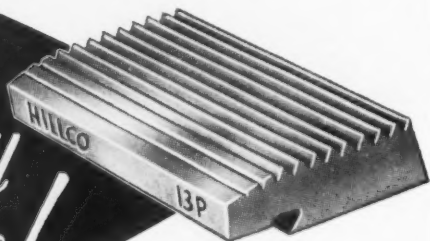
Socket Cap Screws

The Bristol Co., Waterbury 20, Conn. Bulletin 773 gives complete specifications for Bristol's 1960 Series Socket Cap Screws. It includes tables, giving dimensional standards, concentricity limits and threading dimensions for this series. Tables, comparing dimensions of 1960 Series and 1936 Series screws and giving dimensions of 1936 Series screws, are also included.

For more data circle 72 on Postpaid Card

"HILLCO" TANGENT CHASERS

We think you'll agree!



The new line of "HILLCO" Tangent Chasers, which can be re-ground for 80% of their original length, are guaranteed to be of highest grade tool steels ground to exacting tolerances. We feel that this complete line of chasers are the finest that we have produced in our 75 years of cutting tool manufacture. We think that you will agree with us.



THE HILL ACME COMPANY

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1203 West 65th Street • Cleveland 2, Ohio

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Hand Tools

Owatonna Tool Co., 537 Cedar St., Owatonna, Minn. Catalog H-9 is a 16 page, two color catalog which illustrates and describes in detail a wide variety of hand tools, including OTC wrenches, pliers, cutters, screw drivers, punches, chisels, sockets, handles, extensions, socket sets, tool sets, tool chests, feeler gages and miscellaneous tools.

For more data circle 73 on Postpaid Card

Flaw Detector

Branson Instruments, Inc., 40 Brown House Road, Stamford, Conn. Ultrasonic flaw detection is the subject of Bulletin T200, which includes operation, tech-

niques and a complete list of specs for the Sonoray 5 Flaw Detector. This eight page illustrated bulletin describes advantages of a new pulse-echo instrument, which is claimed to have exceptional low frequency resolving power and penetration.

For more data circle 74 on Postpaid Card

End Finishing Machine

Pines Engineering Co., Inc., 643 Walnut, Aurora, Ill. New, four page Bulletin No. 401 illustrates and describes the bench type Model 660 End Finishing Machine, which has been designed and styled to rugged machine tool standards to provide higher production rates and greater accuracy on simultaneous deburring, facing and chamfering operations on tube, rod or pipe ends up to 2 inches in diameter.

For more data circle 75 on Postpaid Card

Fabricator

Wales Strippit, Inc., 207 Buell Road, Akron, N. Y. Catalog 10 A A describes and illustrates the Strippit Fabricator, Model 10-AA, for punching, notching and nibbling.

For more data circle 76 on Postpaid Card

Portable Nibblers

Fenway Machine Co., Inc., 3107 North Broad St., Philadelphia 32, Pa. Two color brochure fully describes the company's complete line of portable nibblers and illustrates both air and electric powered units, heavy duty, as well as medium and light duty, units.

For more data circle 77 on Postpaid Card

Press Equipment

The Hydraulic Press Manufacturing Co., Mount Gilead, Ohio. 16 page bulletin describes the entire line of press equipment for pressure processing. It describes and illustrates metal working presses for forming, drawing, forging, blanking, straightening and embossing; process presses for briquetting, blocking, dehydrating, rayon steeping and powder metallurgy; several models of C-frame presses with a wide range of applications; dieing machines for piercing, perforating, blanking, forming and drawing with progressive dies; and die

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Available in 16 oz. aerosol cans, 1 and 5 gallon cans and 55 gallon drums for spraying, brushing and dipping.

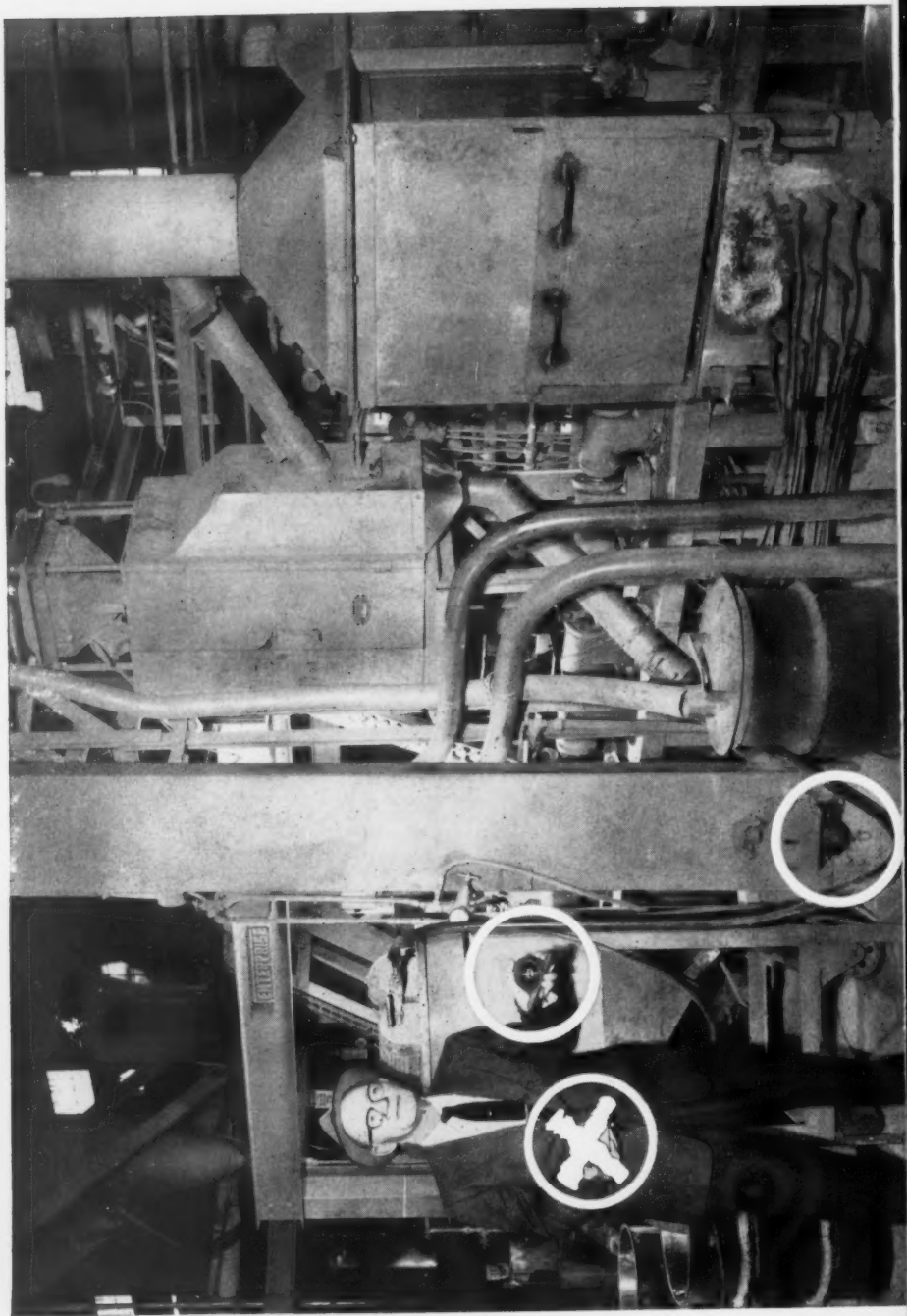


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Send for free copy of CRC 3-36 Bulletin for complete product specifications and cost-saving applications.

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Bearings, Inc. recommended a better seal, a better bearing and savings are \$700.00 a year!

Here's a maintenance foreman who knew where to get help when bearings in his car failed prematurely. He called a Bearings, Inc. engineer when the bearings in this bucket elevator conveyor failed after only two weeks of use.

The Bearings, Inc. engineer found that the powdered zinc transmitted by the conveyor was responsible for the failure. Powdered zinc had worked through the bearing seal and since zinc joins itself when rubbed between two surfaces, being rubbed between the balls and bearing race led to a build-up that stopped the bearings in their tracks.

Analysis of loads and speeds showed a less expensive bearing would work well if its seal would shut out all dirt. The original bearings cost \$16.79 each — the replacement only \$7.36! This meant a net saving of \$700 in bearing costs alone. Now in operation for two years the bearings have been replaced only once.

Bearings, Inc. sales engineers sell only products we are authorized to sell. No deals, no "just as good as" substitutes. Call the branch nearest you — The bearings you want are in stock ready for delivery.

BEARINGS, INC.

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WEST VIRGINIA: Charleston • Huntington • Parkersburg • Wheeling • **NEW JERSEY:** Camden • Newark • **NEW YORK:** Balenrol Corp., Buffalo • Niagara Falls • **MARYLAND:** Baltimore • **DELAWARE:** Wilmington
* **NEUMAN BEARINGS DIVISION,** St. Louis, Mo., E. St. Louis, Ill.

** A recent acquisition*

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casting machines for low cost production of non-ferrous metal parts.

For more data circle 78 on Postpaid Card

Steel and Plate Working Machine

Homstrand Machine Tool Corp., 392 West Putnam Ave., Greenwich, Conn. Brochure presents the Swedish made GV Metal Worker, which is a sheet steel and plate worker for air conditioning, air-

craft, automotive, fabricating, farm equipment, railroad, ship building, structural, truck and trailer industries. The bulletin lists machines up to 5/16 inch capacity.

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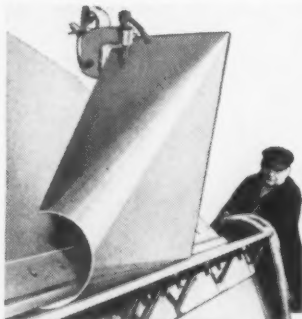
Toolroom Products

The Product Machine Co., The Toolroom Equipment Division, 990 Housatonic Ave., Bridgeport 1, Conn. This new, four page bulletin describes a number of products for the toolroom. The booklet

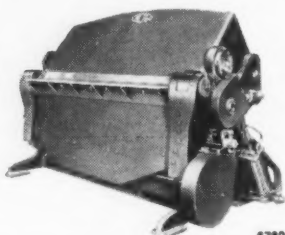
includes illustrations of the Versa-Tap Hand Tapping Machine, Model VT-1; Die Assembler, Model A1-P; Williams Model F-4 Roto Recipro Toolmaking Machine; and three toolroom vises.

For more data circle 80 on Postpaid Card

Bending Steel Plates for WELDMENTS? do it economically with CHICAGO® BENDING BRAKE



The elimination of die costs and the ease of changing from one job to another make the CHICAGO bending brake the economical method for bending steel plates for weldments. An automatic stop regulating the degree of bend assures duplication on successive pieces.



6780

Many standard sizes are available with capacities for bending mild steel up to 12 feet by 3/4 inch or 16 feet by 1/2 inch.

For details on how to do it, ask for Bulletin P-55



Press Brakes • Straight-Side-Type Presses • Press Brake Dies
Hand and Power Bending Brakes • Special Metal-Forming Machines

DREIS & KRUMP MANUFACTURING CO.

7418 South Loomis Boulevard, Chicago 36, Illinois

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Slide Assemblies

Russell T. Gilman, Inc., 624 Beech St., Grafton, Wis. 24 page catalog of standard slide assemblies. The catalog introduces several new types of slide assemblies and includes the other useful models which have been available for several years.

For more data circle 81 on Postpaid Card

Testing Instruments

Custom Scientific Instruments, Inc., Kearny, New Jersey. Catalog No. 60 contains illustrations and brief descriptions of 77 testers or equipment manufactured as standard products. These units include: abrasion testers, biological and scientific equipment, flammability-ignition tester, production, control

and research equipment, thermal conductivity dielectric units and thickness compression and recovery gages.

For more data circle 82 on Postpaid Card

Cutting and Grinding Compounds

Park Chemical Co., 8074 Military Ave., Detroit 4, Mich. Research activities at Park Chemical Company in the field of soluble cutting and grinding compounds have been dedicated to the development of products tailored to individual needs. Somewhere in the listing in this bulletin is a compound whose quality, performance and economy are unexcelled for your operation.

For more data circle 83 on Postpaid Card

Vee Belts

Raybestos-Manhattan, Inc., Manhattan Rubber Division, Passaic, N. J. Bulletin M220 gives design features and performance advantages of R/M/CX Molded Vee Belts. A fully molded, fully jacketed, notched vee belt, this R/M development is made for light duty transmission drives.

For more data circle 84 on Postpaid Card

Polishing Heads

Grinding and Polishing Machinery Corp., 2530 Winthrop Ave., Indianapolis 5, Ind. Bulletin features the full line of Vonnegut Brush-Backed Polishing Heads for sanding, polishing, deburring and other finishing operations. It outlines some of the many applications of the 12, 16 and 32 brush heads, available in a total of nine models from three diameters.

For more data circle 85 on Postpaid Card

Mold Release Oils

Sun Oil Co., Industrial Products Department, 1608 Walnut St., Philadelphia 3, Pa. Mold release oils for zinc and aluminum die castings are described in this new technical bulletin.

For more data circle 86 on Postpaid Card

Internal Grinding Wheels

The Cincinnati Milling Machine Co., Cincinnati Milling Products Division, Cincinnati 9, Ohio. Publication PG-354 describes the features of Cincinnati

CRATEX RUBBERIZED ABRASIVES

*Micro-deburring, Smoothing,
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Cratex reliability lowers costs

You can count on every Cratex item to perform just as you expect it to—exactly as the last one did and as the next one will. This is the key to efficiency in micro-deburring, smoothing, cleaning and polishing. YOU SAVE TIME because you know just what to expect in performance without experimenting or compensating. YOU SAVE REJECTS because with Cratex no unexpected irregularities occur to spoil work pieces.

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in 4 grit textures for power or manual application. Sold through leading industrial supply distributors.

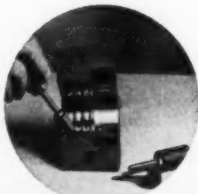
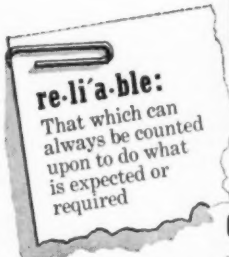
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MANUFACTURING COMPANY, INC.

1600 Rollins Road

Burlingame, California



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free literature . . .

Internal Grinding Wheels. Included is a table of suggested gradings for internal grinding operations and several helpful rules of thumb to be kept in mind.

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Lapping Manual

American Lap Co., 20180 Sherwood, Detroit 34, Mich. Eight page, two color

manual and catalog covers lapping techniques, laps, lapping tools and lapping machines. Lapping techniques are detailed and information is given on fast stock removal, beneficial to those who lap on a production basis, or those whose lapping is limited to an occasional job.

For more data circle 88 on Postpaid Card

Carbide Tipped Saws

W. F. Meyer Co., Inc., Bedford, Ind. Comprehensive catalog shows Meyco Carbide Tipped Saws. In addition to the

many new items in the full line of carbide tipped precision, rip, all purpose, metal cutting, combination planer and portable blades, an entirely new selection of thin-rim saws is now being offered.

For more data circle 89 on Postpaid Card

O.B.I. Presses

The Federal Press Co., Elkhart, Ind. Two color catalog features the newly designed open back inclinable presses. Sizes range from 7 to 125 ton capacities and all are available in either geared or flywheel types.

For more data circle 90 on Postpaid Card

Jaw Clamps

J and S Tool Co., Inc., 871 Dorsa Ave., Livingston, N. J. Literature on all-purpose jaw clamps, which eliminate the use of U-clamps, straps and fingers. Literature contains specifications, pictures and diagrams of these clamps, which secure workpieces quickly and rigidly and which are easily adapted to box fixtures.

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VERTICAL MILL
ACCURATE • BIG CAPACITY • RUGGED

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16" table feed, 12" ram adjustment, 15" vertical knee movement.
8" crossfeed, 4" quill travel.
Hard chromed quill, hand scraped and precision ground ways, accurately finished to accepted machine tool standards. Weighs 1100 pounds. Built in Cincinnati to sell for just \$990.00—less ¾ H.P. electricals.*

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WRITE FOR NEAREST DEALER**

U. S. Burke Machine Tool Co.
3 Brotherton Rd.
Cincinnati 27, Ohio

For more data circle 418 on Postpaid Card

Milling Machines

Tree Tool and Die Works, Racine, Wis. Four page, color brochure discusses Tree 2UVR and 2VG Mills equipped with Scan-o-matic tracer control, which adds fully automatic, hydraulic, three dimensional scanning and profiling to the Tree Mills, yet maintains their full original ranges and capacities.

For more data circle 92 on Postpaid Card

Indexing Machine Chassis

Swanson-Erie Corp., 814 East Eighth St., Erie, Pa. Bulletin describes the Series MD Double Tool Plate Index-

ing Machine Chassis. The bulletin describes design characteristics and application and lists the principal operating features of this machine, which is an entirely new concept in automatic assembly and processing machine design.

For more data circle 93 on Postpaid Card

Plug Gages

Dundick Tool Works, Inc., 3410 West 31st St., Chicago 23, Ill. Flyer on Dundick DeLuxe Steel Plug Gages. Also described and illustrated are custom built, all steel cabinets in which to store the gages.

For more data circle 94 on Postpaid Card

Finishing Machine

Rockwell Manufacturing Co., Walker - Turner Division, Department WG-22, 400 North Lexington Ave., Pittsburgh 8, Pa. Bulletin WT-79 is a four page, illustrated folder which describes the new Walker-Turner Combination Finishing Machine.

For more data circle 95 on Postpaid Card

Product Printing Machines

The Acromark Co., 9 Morrell St., Elizabeth 4, N. J. Reprint illustrates and describes eight different types of printing machines, used for printing plastic products and for filling or applying color to sunken design, lettering or decoration.

For more data circle 96 on Postpaid Card

Materials Handling Equipment

Syntron Co., 309 Lexington Ave., Homer City, Pa. Condensed Catalog No. 605 covers vibratory materials handling



LW CHUCKS
Real Values
in Precision
and Accuracy...



WORKING SURFACE
5 1/2" x 13" \$80.00
6 1/2" x 18" \$100.00
8" x 24" \$213.50
10 1/2" x 37" \$375.00

MAGNETIC GRIP WORK TIGHTLY
For Wet or Dry Grinding
Guaranteed waterproof.
Connections for either 110 or 220v. D.C.

DEMAGNETIZERS
Instantly demagnetize tools or production parts. No moving parts. 110 v., 60 cy. A.C.

PLATE TYPE
MODEL B-2
7 1/2" x 12 1/2" x 6 1/2"
Ship. wt. 55 lbs. \$78.00

MODEL J-1
7 1/2" x 7 1/2" x 6 1/2"
Ship. wt. 35 lbs. \$54.00

ROUND TYPE
3 3/4" openings
\$27.50

RECTIFIERS A.C. input 110 volts. D.C. output 110 volts. P-1 for 5 1/2" x 13" chuck 0.8 amp. \$57.50
P-2 for 6 1/2" x 18" chuck 1.0 amp. \$68.75
P-3 for 8" x 24" and 10 1/2" x 37" chuck 3.0 amp. \$87.50

DEMAGNETIZING SWITCHES For 5 1/2" x 13" and 6 1/2" x 18" sizes. \$15.00
Field discharge type for 8" x 24" and 10 1/2" x 37". \$27.00

LATHE
Heavily ribbed, semi-steel cast body. Ground face and outside diameter. Solid steel hardened and ground jaws. T Hand Wrench included.

4-JAW INDEPENDENT
8" x 10" x 12" x 14"
Reversible jaws wide gripping surface. Tough, oversized hardened alloy steel screws with accurately cut square threads. Hardened alloy steel anchor bearings.

3-JAW UNIVERSAL
Guaranteed to run true for lathe or screw machine. 10" sizes come complete with two sets of accurately fitted threaded 1 1/2" x 8" (or can be furnished one set of 3 reversible jaws). One high grade hardened steel pinion used on 5", 6", and 8", 3 on 10" size. Special alloy scroll.

SEE YOUR DEALER OR ORDER DIRECT, GIVING DEALER'S NAME



ADJUSTO-QUICK VISE



DIVIDING HEAD



LW CHUCK COMPANY



MILLING MACHINE VISES

28 So. St. Clair St.
Toledo 4, Ohio

For more data circle 419 on Postpaid Card

free literature . . .

equipment, vibrating parts handling equipment, power rectification equipment, mechanical shaft seals, paper joggors and portable power tools.
For more data circle 97 on Postpaid Card

Drill

Ingersoll-Rand, 11 Broadway, New York 4, N. Y. Six page color folder on the air

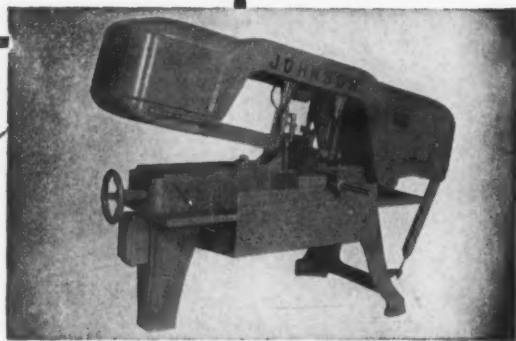
powered Mech-feed Drill, which provides matched positive feed rate, accurate drilling, clean holes and less operator fatigue. It is ideal for drilling alloys, variable setups, gang drilling or precision drilling.

For more data circle 98 on Postpaid Card

Arc Welding Guide

Hobart Brothers Co., Troy, Ohio. "Vest Pocket Guide to Better Welds" contains 80 pages of arc welding information on fire essentials for proper welding procedures, examples of good and bad welds, welding positions, operator qualifications, welding metals, steel available for welding, identification of metals and so on.

For more data circle 99 on Postpaid Card



Model J (Heavy-Duty) (Wet or Dry Models)

Johnson Model "J" . . . the heavy duty band saw that speaks for itself. No other saw handles so many operations so easily and so economically. Why pay more when a Johnson Model "J" can cut the 10" rounds, 18" flats and odd shaped steels of your shop in such labor saving time. The Big "J" is completely automatic—and is available in a wet or dry model, both with variable speed and centralized control system. You can't afford to miss any information on the rugged Johnson Model "J". Contact your dealer today!

Johnson MANUFACTURING CORPORATION
1011 BARNES ST. ALBION, MICH.

Eastern Distributor	Midwestern Distributor	Western Distributor
R. J. R. KELLY CO.	W. Q. LUNDMARK	HASTINGS DISTRIBUTORS
Hale Bldg., 51 Main St.	75 N. Broadway	1605 Solano Avenue
East Orange, N. J.	Des Plaines, Ill.	Berkeley, Calif.

Air Presses

Niagara Machine and Tool Works, Buffalo 11, N. Y. A new line of precision built, single acting, air presses is fully described and illustrated in this two color, four page bulletin. Consisting of 28 models, this line is built around four basic press sizes, ranging from ½ to 2 ton capacities at 85 pounds per square inch.

For more data circle 100 on Postpaid Card

Tracer Stylus Sets

True-Trace Corp., 9824-30 Rush St., El Monte, Calif. Bulletin No. TSS-1 describes and illustrates stylus sets, which are an ideal accessory for every duplicator machine. They save countless hours of making a tracing stylus every time one is required for a job.

For more data circle 101 on Postpaid Card

For more data circle 420 on Postpaid Card

Machinery Mounts

Barry Controls, Inc., 700 Pleasant St., Watertown 72, Mass. Bulletin No. 546 provides detailed information and illustrations on Barry Machinery Mounts. Five important features are: no lagging and no shimmying; make machines mobile for flexible layout and better work flow; reduce maintenance to a minimum; improve accuracy with less spoilage of precision work; quietness.

For more data circle 102 on Postpaid Card

Valves

Ross Operating Valve Co., 120 East Golden Gate Ave., Detroit 3, Mich. Four page bulletin on "Controlled Air in Action," providing two hand safety, immediate and delayed cylinder movement, deceleration of rapid cylinder movement, cylinder reciprocation and cylinder extension-dwell-retraction with momentary start.

For more data circle 103 on Postpaid Card

Grinding Wheels

Simonds Abrasive Co., Tacony and Fraley Streets, Philadelphia 37, Pa. Illustrated catalog describes toolroom grinding wheels, featuring SA Borolon, single crystal type, friable aluminum oxide abrasive for tool and cutter grinding and for horizontal surface grinding. Form ESA-272 includes grain and grade recommendations, arranged according to standard tool steel classifications.

For more data circle 104 on Postpaid Card

Axial Piston Pumps

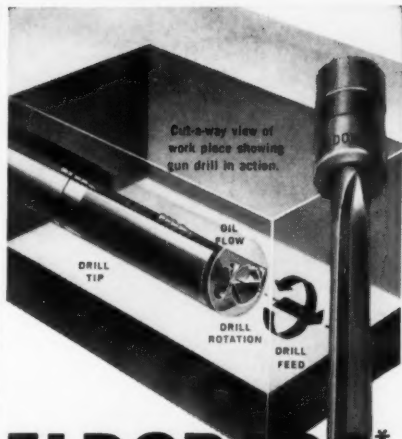
American Brake Shoe Co., Denison Engineering Division, 1160 Dublin Road, Columbus, Ohio. Eight page brochure outlines the use of Denison Axial Piston Pumps at pressures up to 5,000 p.s.i. It discusses 30, 40 and 60 Series Pumps, in constant and variable volume models.

For more data circle 105 on Postpaid Card

Steel

La Salle Steel Co., Post Office Box 6800-A, Chicago 80, Ill. Case Study Portfolio No. 1 shows a variety of applications of "Fatigue-Proof" Steel Bars in metalworking machinery and equipment parts. Containing a total of nine individual case studies, the portfolio shows how manufacturers are meeting and solving difficult problems related to parts production. Each case study describes the machinery, specific part involved and the material it replaced. Included is data concerning the elimination of heat treating, straightening, grinding and distortion, plus improvements in machinability, wear and cost.

For more data circle 106 on Postpaid Card



ELDORADO* GUN DRILLS

DRILL HOLES

more economically

...more efficiently,

with controlled surface finish.

Drill straight, round, accurately finished holes at high speeds... through solids, blow-holes, hard spots and cross-holes, in one single operation.

If you use gun drills... it'll pay to find out how ELDORADO can cut your costs. Chances are, there's an ELDORADO GUN DRILL in stock for you.

IN STOCK FOR IMMEDIATE SHIPMENT

Sizes	1/8" to 1/2" dia. in 64ths	1/2" to 3/4" dia. in 32nds
OA Lengths	10", 16", 22", 36"	16", 22", 36"
Drivers	.750" dia. x 2 3/4" long	1" x 2 3/4" long
Tips	Carbide	Carbide

MADE TO YOUR SPECIFICATIONS

Sizes	.1250" to 2" dia.
OA Lengths	4" to 120" with dia. limits
Drivers	To fit your need
Tips	Carbide



(*) Trade Mark

Specializing 100% in Gun Drills and Related Tools.

ELDORADO TOOL & mfg. corp.

364 Boston Post Road • Milford, Conn.

For more data circle 421 on Postpaid Card

NEWS

of the industry

**Company expansions and acquisitions . . .
officers . . . obituaries . . . retirements.**

Edited by L. L. BALDHOFF

WARNER AND SWASEY OPENS NEW RESEARCH CENTER AT SOLON, OHIO

Displaying the motto "Building For the Future" on the wall of its main entrance lobby, the newly completed 40,000 square foot Research Center of The Warner and Swasey Company is now fully staffed and in operation at Solon, Ohio.

Of ultra-modern, aluminum and

brick construction, the one story center is located on 12 acres of attractively rolling suburban land, east of Cleveland. The new facility, said to be one of the largest and most modern in the machine tool industry, more than doubles the space available to the company for its research and development work.

This research center, according to Walter K. Bailey, president of Warner and Swasey, brings together, insofar as



Figure 1—New Research Center of The Warner and Swasey Company in Solon, Ohio.



Figure 2—High-bay general test section of Warner and Swasey Research Center.

practical, all research and development activities and personnel of the company for greater efficiency and economy. In addition to machine tool development projects, the center also will handle textile machinery and earth-moving equipment design and test work.

Separate departments within the research center include machine design, systems design, electronic controls, servo development, instruments, metal cutting and metallurgical laboratories, and research engineering, plus a prototype shop capable of fabricating full scale working models of new product designs. Approximately one-third of the total structure is a high-

bay general test section equipped with heavy handling equipment.

Textile engineering facilities, centered around a special humidity and temperature controlled machine test laboratory which can simulate most any desired set of textile mill operating conditions, have been provided.

Also included in the layout are administrative offices, a library, blue-printing and microfilming facilities with a fireproof vault, and a spacious conference room with a seating capacity of approximately 100. The conference room includes projection equipments and has provision for both model display and demonstration. The entire research center, with the

DYKEM STEEL BLUE

Stops Losses

making Dies and
Templates

Popular package
8-oz. can fitted
with Bakelite cap
holding soft-hair
brush for applying right
at bench; metal surface
ready for layout in a few min-
utes. The dark blue background
makes the scribed lines show up in
sharp relief, prevents metal glare.
Increases efficiency and accuracy.

Write for sample on company letterhead
THE DYKEM COMPANY
2301F North 11th St. • St. Louis 6, Mo.

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news of the industry . . .

exception of the high-bay test section, is fully air conditioned.

Close attention has been paid to the selection of "non-jarring" colors for interiors throughout the center. According to the company, this was done to maintain a calm, creative atmosphere. Warm pastel shades predominate, ranging from deep browns to creams. Wood paneling and cork are liberally used in offices and lobby.

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**THOMAS C. WILSON
ANNOUNCES ELECTION OF
THREE TOP OFFICERS**

The election of Mrs. Martha A. Wilson as board chairman, O. J. Bagnoli as president and Alexander John as vice president has been announced by the board of directors of



M. A. Wilson, O. J. Bagnoli and A. John

Thomas C. Wilson, Inc., Long Island City, New York.

Thomas C. Wilson, Inc. manufactures precision tube cleaners, tube expanders, allied tools and portable pneumatic production tools. The company was founded in 1925.

Mrs. Wilson was formerly president of the company. Mr. Bagnoli was vice president and general manager and

Haskins

The Handiest Tool in Your Shop

Depend on equipment that does the job best with the lowest cost.

Use *Haskins* equipment for longer life, more trouble free service, and real economy.

Send for Catalogs Today!



R. G. HASKINS CO.

2649 W. Harrison St., Chicago 12, Illinois

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Mr. John was sales manager and assistant general manager. Mrs. Wilson became president in 1936, following the death of her husband who founded the company.

Mr. Bagnoli joined the company in 1931. He held various supervisory posts before becoming vice president and general manager, the position he held prior to his election as president. He is a member of the Society of Naval Architects and Marine Engineers.

Mr. John joined Wilson's engineering department in 1935. He served as shop superintendent and sales manager before his election as vice president. He belongs to the National Association of Power Engineers, the American Society of Mechanical Engineers and the Society of Naval Architects and Marine Engineers.

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WILLIAM H. ROBERTS

William H. Roberts, executive vice president of Detroit Stamping Company, Detroit, Michigan, died suddenly at the age of 42. He was the son of a widely known Detroit family which, at one time, owned and oper-

ated the large Roberts Brass Company plant. His father, William Herbert Roberts, founded the Detroit Stamping Company.

During his entire adult life, Mr. Roberts worked for Detroit Stamping company and is largely credited with the development of the large line of De-Sta-Co Toggle Clamps, which are marketed throughout the western world.

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HESSLAR T. GATES

The Fellows Gear Shaper Company, Springfield, Vermont, announces the



NEW ADJUSTABLE BURRING TOOL . . .
 a handy vest pocket scraper and burring instrument. Blades are fully retractable, replaceable and easily sharpened. Cutting length adjustable to 3", can be reversed to use either end. Made from hi-quality, hi-speed tool steel for long life. Ideal for burring in aircraft and other light metal operations—overall length 4½".
 Complete \$2.54 ea. Min. order 6 Blades \$12.50 doz.
 Write for Additional Information.
 Dealer Inquiries Invited.
TITAN TOOL SUPPLY CO.
 Box B, 1419 Hertel Avenue, Buffalo 16, N. Y.

For more data circle 425 on Postpaid Card

PRECISION SHAPLANE RADIUS TOOLS

EIGHT MODELS FOR LATHES, SHAPERS, PLANERS AND BORING MILLS

Range: ⅜" to 3" for concave radii on lathes. Two sizes for convex radii (Balls up to 2½" dia.) on lathes. Also heavy duty model for radii to 6" on planers, etc.

Write for circular

C. B. TEETER - Tool Room Specialties

3443 N. Greenview Ave., Chicago 13, Illinois • Phone DRexel 3-3571

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news of the industry . . .

death of Hessler T. Gates at his home in Charlestown, New Hampshire.

Before his retirement in December 1956, Mr. Gates was vice president and factory manager and a member of the board of directors.

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PHILIP O. GEIER, JR. MOVES UP AT CINCINNATI MILLING

The Cincinnati Milling Machine Company, Cincinnati, Ohio, announces that Philip O. Geier, Jr. has moved up in Cincinnati Milling's management team.

He was recently elected vice president and appointed assistant general manager of The Cincinnati Milling Machine Company. Mr. Geier was formerly manager of the Products Division of Cincinnati Milling.



Philip O. Geier, Jr., Maurice Gormly



Maurice Gormly has been appointed manager of the Products Division of The Cincinnati Milling Machine Company. He succeeds Philip O. Geier, Jr.

Mr. Gormly has been with Cincinnati Milling since 1951. Prior to his new position, Mr. Gormly was director of the Grinding Wheel Laboratory and manager of the Grinding Wheel Plant.

New **VOGEL AUTOMATIC CUT-OFF MACHINES**

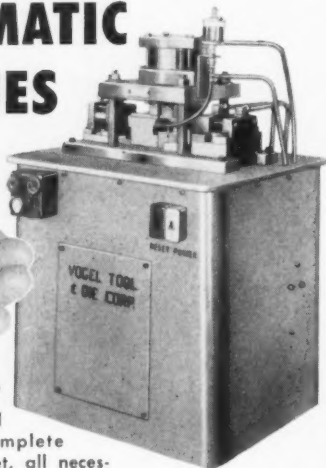
Pneumatic or Hydraulic

Units shear clean to accurate lengths FAST with practically no burr or distortion

SAMPLES ▶
were sheared off by new Vogel Automatic Cut-Off Machines.



▶ **SELF** contained CUT-OFF unit complete with base cabinet, all necessary switches and controls, ready for operation.



Phone **FILLMORE 5-0160**, or write to:

VOGEL

VOGEL TOOL AND DIE CORPORATION

1823 NORTH 32nd AVENUE • STONE PARK, ILLINOIS

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SUPERIOR HONE COMPLETES PLANT IN ERWIN, TENNESSEE

Completion of the construction of a new 15,000 square foot plant at Erwin, Tennessee, and the start of operations on the first production line, have been announced by Albert Hasty, president of Superior Hone Corporation.

Main offices, engineering and development work and facilities for special runs of honing machines will continue at the Elkhart, Indiana, company headquarters.

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A. B. HOLMSTROM RETIRES FROM NORTON COMPANY

Andrew B. Holmstrom has retired as vice president of Norton Company, Worcester, Massachusetts, abrasive products manufacturer.

Mr. Holmstrom started at Norton Company 41 years ago in the plants engineering department. In 1930 he was resident engineer in charge of construction at the company's Welwyn Gardens, England, plant. He was later general manager there.

He was elected a director of Norton Company in 1940 and a vice president in 1944.

Mr. Holmstrom was mayor of Worcester from 1950 to 1954 and is now a member of the City Council.

He is a member of more than 40 civic, fraternal, engineering and other organizations.

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GISHOLT ANNOUNCES PROMOTION

Gisholt Machine Company, Madison, Wisconsin, announces the promotion of Werner I. Senger from vice president in charge of balancing to vice president in charge of engineering. Mr. Senger's function will be the administration of all engineering for

all products manufactured by the company, with the exception of those in the Plastics Division. He has been with Gisholt for over 43 years. In 1924 he was placed in charge of balancing machine development and engineering and in 1953 he was made vice president in charge of balancing.

Gisholt also announced that George

Most Drilling Per Dollar!

Veet 3 foot RADIAL



Features Found Only In Highest Priced Radials

Finger-Tip Clutching
Automatic Drill Ejector
Push Button Elevation
Centralized Controls

Hardened Column & Way Inserts
Automatic Depth Control
Timken Bearing Column & Spindle
Head Guides on Ball Bearing Rollers

Send for Brochure of Veet's 16 Points of superiority and name of nearest dealer, who will arrange actual demonstration of the Veet Radial, in your plant, without obligation.

Refer to Thomas Register or Hitchcock's Machine & Tool Directory for further information.

MFQD. BY **Veet INDUSTRIES** EAST DETROIT, MICH.
Tel. FRancisc0 6-3000

Mrs. of the VEET High Pro '30' SPEEDMILLER for Planer Conversions

For more data circle 427 on Postpaid Card

news of the industry . . .

M. Class, vice president and a member of the board of directors, will now devote his efforts to increased customer relations, patent administration and special projects, as well as serving in a general advisory capacity. Mr. Class has been with the company for over 35 years. He was made a vice president in charge of engineering in 1955 and was elected to the board in 1957.

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**HEALD MACHINE EXPANDS
NUMERICAL CONTROL
PRODUCTION FACILITIES**

Hartwell G. Howe, vice president and general manager of The Heald Machine Company, Worcester, Massachusetts, announces that the company is expanding facilities for assembling

and testing numerically controlled machine tools.

"With our backlog for these machines the largest in history, the new and expanding field of numerically controlled machines makes necessary additional floor space for building and testing these complicated units," Mr. Howe said. "Numerical control is employed on Heald Bore-matics, precision grinders and new products under development," he said.

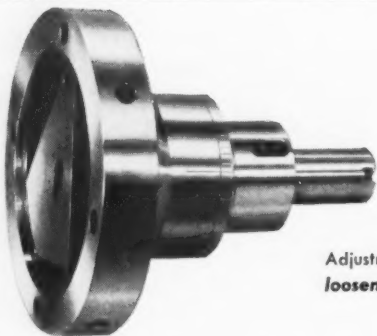
A special air conditioned and humidity controlled enclosed area, containing 2,400 square feet, has been built inside the Heald plant for assembly and run-off testing of the machines. It will supplement present Heald facilities for manufacturing numerical control and special purpose classified machines. Removable walls facilitate transfer of machines to and from the area.

In the new area, a constant temperature of 70 degrees is maintained.

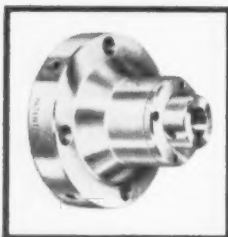
BRINEY

PRECISION BORING QUILLS

**PERMIT
AUTOMATIC
RETRACTION
AND FEED-OUT**



Adjustments to 0.0001 **without
loosening or tightening screws.**



OTHER SPECIALS—miniaturized quills for cluster boring, combination bottom facing and I.D. boring with precision depth and bore control, block type tooling for precision boring and O.D. turning on vertical or horizontal bed multi-purpose machines, and many other applications.

AND STANDARDS—carried in semi-finished stock for quick delivery.

SPECIFY BRINEY PRECISION QUILLS ON ORIGINAL EQUIPMENT
WRITE TODAY FOR COMPLETE DESCRIPTIVE LITERATURE

BRINEY MFG. CO. 1165 SEBA RD. • PONTIAC, MICH.

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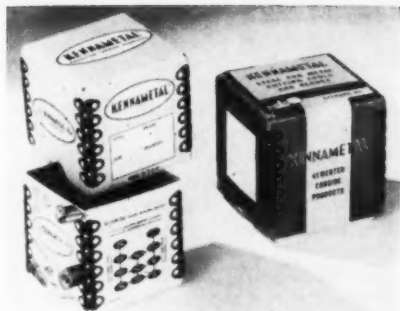
This control is as necessary in manufacture and testing of the machines as it will be when the machine is operating under production conditions in the customer's plant. Constant conditions of temperature and humidity are essential factors to the maintaining of extreme precision and repetitive accuracy.

The Heald Machine Company, a subsidiary of The Cincinnati Milling Machine Company, is a major manufacturer of precision boring and grinding machines, ranging from simple toolroom equipment to complete automated transfer lines.

★ modern machine shop ★

KENNAMETAL MODERNIZES ITS PACKAGING

Kennametal, Inc., Latrobe, Pennsylvania, manufacturer of internationally distributed cemented carbide products,

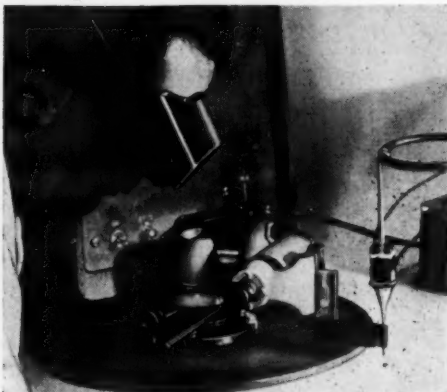


New Packaging for Kennametal Products.

has redesigned its entire line of packages. The new design has taken advantage of modern packaging techniques, maintained a family recognition for the products and effected substantial savings.

The Kennametal logo has been encased in a white oval on a yellow

People work better when they SEE BETTER®



Lockheed Aircraft Corp., Missile Systems Div., uses MAGNI-FOCUSER to watch Ultrasonic Drill making holes five thousandths of an inch, the size of human hair.

MAGNI-FOCUSER

EDROY PRODUCTS CO., Dept. P, 480 Lexington Ave., New York 17, N. Y.

For more data circle 429 on Postpaid Card

For increased production, greater accuracy, fewer accidents and errors, use the MAGNI-FOCUSER—the new 3-D binocular magnifier with matched prismatic lenses. It provides needle-sharp vision — greatly magnified and in third dimension.

Scores of industrial jobs are being aided by the MAGNI-FOCUSER. It reduces eye strain and avoids squinting; leaves both hands free to work. It's light weight; can be worn with or without eye glasses; normal vision resumed simply by raising the head.

Speed your production by ordering now on 10-day trial basis without obligation. Only \$10.50. Immediate delivery. Or write for illustrated folder.

the 3-D Magnifier that speeds production and leaves both hands free to work

news of the industry . . .

field, thereby creating a bull's-eye effect.

One of the most outstanding improvements was made by imprinting the outside of the bottom of the box. Photographs of Kennametal products are shown, as well as a chart indicating the Kennametal Grade Selection System.

In addition, space is provided to identify the size, grade and style of the material in each box.

The customer service theme is continued on the lids of the boxes, which are provided with label ends with spaces providing for imprinting the "style", "grade", "size" and "quantity".

The new package combines strength and durability with easier-to-read design elements, as well as customer information.

ONSRUD BUYS BERTHELSEN HYDRAULIC PRESS DIVISION

Charles R. Onsrud, president of Onsrud Machine Works, Inc., Niles, Illinois, has announced the purchase of the Hydraulic Press Division of the Berthelsen Engineering Works, Inc., Joliet, Illinois.

This purchase is the result of the company's recently instituted program of expansion and manufacturing diversification. The Berthelsen products line, acquired by Onsrud, includes heated-platen single and multi-opening presses for laminating plywood, reconstituted board products, metal, plastics and rubber.

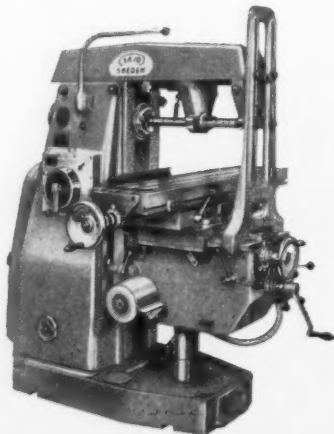
Manufacturing, sales and service will be carried out under the newly formed Onsrud Berthelsen Hydraulic Press Division. Key Berthelsen personnel are being retained. This new line is considered by Onsrud as an

PAINSTAKING ATTENTION TO DETAIL characterizes SAJO Millers

exemplified by the unsurpassed SAJO spindle construction employing double-row staggered roller bearings and ball thrust bearings — assures utmost stability and smooth transmission of full horsepower to cutter.

Available as
Plain, Universal & Vertical Millers.
Production Millers with automatic
cycling.

No. 2 Universal Miller
table size: 52" x 11"
7½ and 1½ HP motors,
rapid power traverse.



@ austin industrial corporation

76-H Mamaroneck Avenue

White Plains, New York

For more data circle 430 on Postpaid Card

ideal addition to the products now manufactured and sold by the company's present Machine Tool, Woodworking Machinery and Portable Tool Divisions.

★ modern machine shop ★

NEW QUARTERS FOR TAP CARTRIDGE COMPANY

The Tap Cartridge Company, Cincinnati, Ohio, manufacturer of wax cartridges for chip-free, blind hole tapping, has moved its offices and manufacturing facilities to a new plant site.

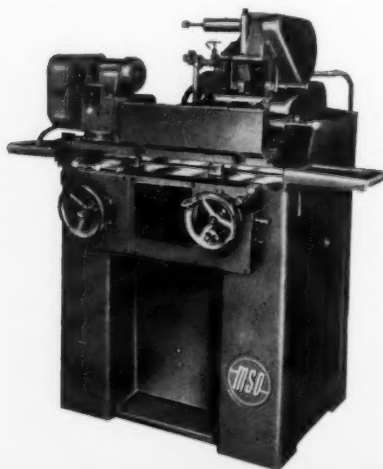
E. B. Holden, president of the company, announced that the new location is 326 Railroad Avenue, Cincinnati 17, Ohio, in the heart of that city's heavy industrial area. Mr. Holden named Robert M. Loebelson as vice president of the firm.

FOREIGN METALLURGISTS VISIT ADAMAS CARBIDE PLANT

Recently, delegations of world renowned metallurgists, attending the International Powder Metallurgy Conference in New York, made extensive guided tours of the modern, award-winning Adamas Carbide Corporation main plant and its recently completed addition in Kenilworth, New Jersey.

Edward L. Dreyer, president of Adamas, welcomed each group of metallurgists, composed of representatives of a wide number of foreign countries. Adamas provided both guides and interpreters for each ten man guest group as it toured the plant.

Each group came to study the production techniques, from initial powder processing to final product inspection, used by Adamas in the manufacture of its cemented tungsten carbide tools, tool tips, dies, wear



MSO GRINDERS - PACEMAKERS for better grinding methods —

The ultimate in precision grinding to close tolerances with micro inch finish — for Toolroom — for Production

MSO builds

Universal Grinders

Production Grinders

with automatic plunge or
traverse grinding cycles

Thread Grinders

When only the best will do — check
MSO first

Model FMES Universal Grinder
with compound swivel wheelhead
capacity 7" x 12"

(a) austin industrial corporation

76-H Mamaroneck Avenue

White Plains, New York

For more data circle 431 on Postpaid Card



Foreign Metallurgists visit Adamas Carbide Plant in Kenilworth, New Jersey.

parts and Dex-A-Tools. The fact that the visitors were impressed with what they saw and heard was attested to by their numerous interested questions and comments. The week long Inter-

national Powder Metallurgy Conference and the Adamas Plant visits were sponsored by the Metal Powder Association and the Powder Metallurgy Committee of the A.I.M.E.



The "Other Side" of CLOVER ABRASIVES

The most important side of coated abrasives is, naturally, *the cutting surface.*

But *the reverse side* can mean more to the user than the superficial appearance of the grit. It carries data on the bond, the weight of the cloth or paper, and the kind of grain. All of this has a great deal to do with the *performance* of the product.

Moreover, the manufacturer's name is a signature. If it says "Clover" on the back, you can be sure it is the best of its kind. Ask for a new Clover Catalog and get acquainted with our full line of abrasive products—it is *good business!*

Clover Manufacturing Company

Norwalk, Connecticut

Makers of the famous

Victor 7-4515

Quality Abrasives
Since 1903

CLOVER Grinding and Lapping COMPOUNDS

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LATROBE STEEL COMPANY ANNOUNCES NEW PRESIDENT

Resignation of M. W. Saxman as president of Latrobe Steel Company, Latrobe, Pennsylvania, with his continuance as chairman of the board, and the elevation of J. E. Workman, executive vice president, to the presidency, was announced by the company's board of directors. The company is a

major producer of tool, die and specialty steels.

Retirement of Mr. Saxman as chief executive officer culminates 36 years of service with the company. Joining the company in 1924 as superintendent of the Cold Finishing Department, Mr. Saxman in 1935 assumed the duties of vice president in charge of sales. This post he held until 1940 when he was elected president. In

Wilson "Superficial" makes Shallow Measurements Accurately

Wilson Rockwell Superficial hardness testers are used to measure surface hardness, coatings, thin metal or thin hard cases. The hardness test is based on a penetration of less than .005", and Wilson Superficial testers have the precision and ease of operation to give accurate readings every time.

Accurate—Precision-built for consistently correct results.

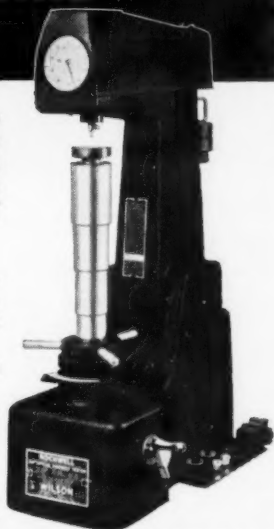
Knife-edge bearings provide near-frictionless operation.

Easy to operate—Controls conveniently grouped—oil dash-pot system provides smooth load application.

Long lasting—Simple design, rugged construction make Wilson Superficial testers as durable as a machine tool.

Complete line available—Wilson Rockwell hardness testers and accessories are available in a wide variety for every hardness testing function. Also "Brale" diamond penetrators for perfect readings every time.

Write for details—Ask for Catalog RT-58. It gives complete information on the Superficial tester as well as on the full line of Wilson Rockwell hardness testers.



Wilson Rockwell Superficial
Hardness Tester

WILSON "ROCKWELL" HARDNESS TESTERS

Wilson Mechanical Instrument Division
American Chain & Cable Company, Inc.

230-G Park Avenue, New York 17, New York

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news of the industry . . .

April of this year he was elected chairman of the board of directors.

Mr. Workman is chairman of the Tool Steel Producers Committee of the American Iron and Steel Institute, is a member of the Toledo Chapter of the American Society of Tool and Manufacturing Engineers and the



(Left) M. W. Saxman and J. E. Workman

Mold your own LEAD HAMMERS

Here's the inexpensive, fast way of molding and remolding your own lead hammers with this COOK mold and ladle. It produces hammers that can "take it". Simple to operate.



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for circular
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COMPLETE
LEAD HAMMER
SERVICE

COOK LEAD HAMMER SERVICE

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HOW TO . . . Bend Thin-Walled

Tubing, faster and better . . . with



CERRO*
ALLOYS

For bending thin-walled tubing, CERROBEND® . . . a low-temperature-melting bismuth alloy (CERRO ALLOY) . . . is the ideal filler. CERROBEND is poured into an inclined tube immersed in hot water, then the loaded tube is removed and rapidly quenched in cold water. Upon assuming shop temperature, the loaded quenched tube can be bent over a forming block or in a regular bending machine. The CERROBEND ALLOY melts out easily in boiling water.



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63 CERRO ALLOY
Applications

**CERRO DE PASCO
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304 PARK AVENUE, NEW YORK 22, N. Y.
*T.M. Cerro de Pasco Corporation

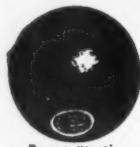
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American Society of Metals. He is a member of the Duquesne Club of Pittsburgh, Pittsburgh Athletic Association and is active in many charitable organizations. A native of Brink Haven, Ohio, he attended the University of Toledo prior to joining the Latrobe Steel Company sales staff.

REID

TOOL ROOM ACCESSORIES

CONTROL BALL HANDLES



Round Plastic



Oval Plastic



Mushroom Plastic

Designed for machine tools, jigs, fixtures, etc. Round and oval plastic types can be supplied in red and black. Made in many diameters and thread sizes. Can also supply highly polished steel ball handles.

FREE 88-Page Catalog

Send for it today. Lists 1800 items needed in every tool room such as hand knobs, compression springs, hand wheels, clamping handles, etc.

REID TOOL SUPPLY CO.
MUSKEGON HEIGHTS, MICHIGAN

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**Accurate Hole Transfer Made Easy With
NIELSEN TRANSFER SCREWS**

Simply insert in holes, invert, strike sharply and you have centers and drill circles perfectly located. Reduce time and eliminate spoilage of other methods. 8 sizes, from $\frac{3}{16}$ " to $\frac{3}{4}$ " U.S.S. Inexpensive — Last for years.



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**NIELSEN TOOL &
DIE COMPANY**
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Near Grand River
Detroit 19, Michigan

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70,000 R.P.M. TURBINE AIR GRINDER

**GUARANTEED
FULL YEAR**

\$49.50

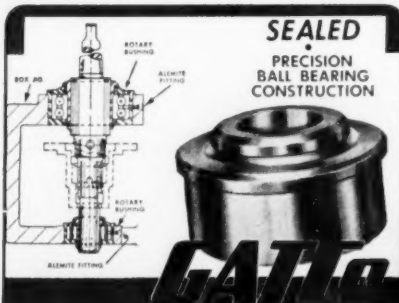
complete
including
accessories



Perfect for intricate
tool and die work

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BALL BEARING
CONSTRUCTION**

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ROUGH AND FINISHED BORING**

The inner race of the GATCO bushing rotates with the tool, piloting the tool accurately below or above the work - or both.

Eliminates expensive tool construction - Reduces tool wear - Prevents seizure and pilot breakage - Especially adapted where precision is required.

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ZIEGLER FLOATING TOOL HOLDERS

INCREASE TAPPING AND REAMING PRODUCTION

FAST SET-UPS — automatically compensates for misalignment up to $\frac{1}{16}$ " on dia. between machine spindle and work.

Free-Floating, Easy-To-Use Ziegler Tool Holders permit machine operators to maintain production without scrappage due to alignment inaccuracies, eliminate bell-mouthed and oversize holes and keep job set-up costs to barest minimum.

PROMPT DELIVERY

◀ **SIZES** and types to fit all machines used for tapping and reaming.



Hold positive hole
location tolerances



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CATALOG
TODAY**

W.M. ZIEGLER TOOL CO.

ROLLER DRIVE FLOATING TOOL HOLDERS

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Detroit 23, Michigan

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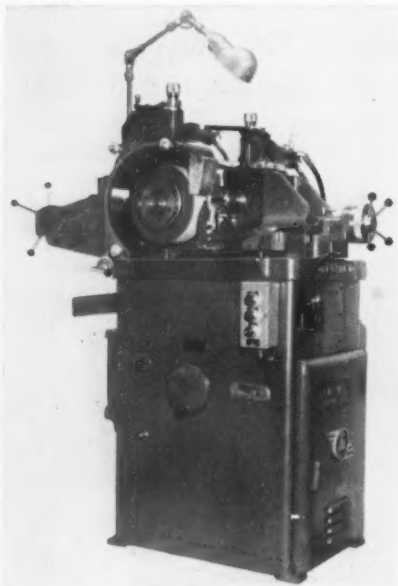
equipment

***Descriptions of new machines, tools
and materials for metalworking.***

Edited by L. L. BALDHOFF

CENTERLESS GRINDER

Royal Master Grinders, Inc., 272 Highway 23, Riverdale, N. J., has



24 by 48 Inch Centerless Grinding Machine

added to its line a new, high precision, centerless grinder with a permanently mounted crush dresser which has been designed for throughfeed, plunge feed and infeed.

This model, CG-12, is 24 by 48 inches including coolant tank, and grinds multiple diameter parts and intricately shaped profiles. It can grind a variety of materials such as tungsten carbide, stainless or carbon steel, glass or plastic to 0.0002 or 6 or 8 micro finish. It also grinds wood, non-ferrous metals, fibre, hard rubber, ceramics and cork.

Among its special characteristics are: high output and fast checking with both sides of the wheel accessible from operating position; can work with accuracy and dependability; coolant tank is mounted on casters for mobility.

It also features massive heat treated alloy spindle with ball bearings lubricated for life; wheel dressers can be either manually or hydraulically operated; mounted wheel is easily lifted by one man; regulating wheel spindle is mounted "between" ball bearings to prevent deflection.

For more data circle 107 on Postpaid Card

and materials

20 INCH POWER FEED DRILL PRESSES

A line of 20 inch power feed drill presses, with up-front controls that permit one hand operation, is introduced by Rockwell Mfg. Co., Delta Power Tool Div., 606-G North Lexington Ave., Pittsburgh 8, Pennsylvania.

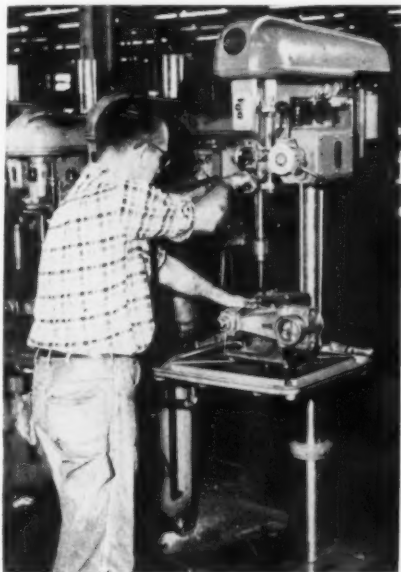
Available in 18 models including bench, floor, multiple spindle and as an overhead track-mounted tool, the machine is said to combine the adaptability of a power tool with the ruggedness and capacity of a machine tool. It has a connection from which automation devices, such as rotary tables, may be controlled and synchronized with spindle operation.

The power feed drill press limits the operator's work to loading, unloading and actuating the tool, giving him time to operate other tools or prepare the next piece during the actual machining cycle. It is said that two or more operations can often be performed in the time required for one on a manually operated drill press. Where other operations cannot be performed during the machining cycle, the tool lessens operator fatigue, thereby increasing output. Power feed also improves quality of drilling because of the uniformity in feeding.

The power feed features a unique

front-mounted pilot wheel control that is mechanically integrated with the clutch control, allowing one hand operation. There are four feed ratios—0.004, 0.006, 0.009 and 0.012 i.p.r.—with each of the five spindle speeds.

Another feature of the power feed is a "come-type" clutch that permits the



Delta 20 Inch Power Feed Drill Press

new equipment . . .

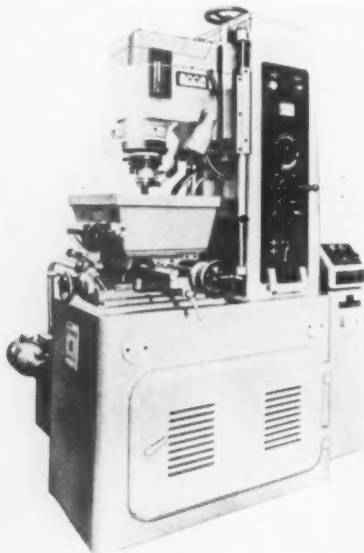
use of power feed on a production basis through a wide range of hole diameters. By a simple torque adjustment, the operator switches from a machine that delicately handles small drills in the 1/16 inch range, to a machine delivering 1,000 pounds of thrust for drilling holes up to 1 inch in cast iron.

For more data circle 108 on Postpaid Card

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AUTOMATIC ELECTRICAL DISCHARGE MACHINES

Charmilles Engineering Works, Ltd., 25-20 Forty-Third Ave., Long Island City 1, N. Y., announces a line of high precision electrical discharge machines, the Eleroda D1 and the Eleroda D15. Swiss craftsmanship and American know-how have been com-



Eleroda Electrical Discharge Machine.

bined in the design of these machines.

Important features of the Eleroda D1 include: magnetic electrode holder for working and locating within plus or minus 0.0002 inch; hydraulic servo; table with jig borer accuracy; stable electrical power unit (no tubes); 10 micro inches surface finish guaranteed; heavily ribbed castings used throughout; fully automatic.

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NEW METHOD OF GRINDING FLAT SURFACES

A new type of rotary indexing surface grinder, on which the work is held in a stationary fixture under a wheel spindle that orbits as it rotates, reduces the cost of grinding pieceparts to close flatness tolerances. The grinder, manufactured by Mattison Machine Works, Rockford, Ill., is being used in its first commercial application to grind pump piston cover assemblies to a flatness tolerance of 0.0005 inch at a production rate of 140 per hour. Stock removal is 0.004 inch.

The principle of generating a flat surface on a planetary head machine is similar in end result to what takes place on a conventional vertical-spindle rotary surface grinder. Instead of the piecepart spinning under a stationary spindle, however, it remains fixed and lets the wheel axis revolve around its center point.

Mattison planetary head machines are designed to take advantage of self-dressing wheels. Once the wheel has been trued during initial setup, wear takes place evenly so that perfect flatness results. A post-process gaging system actuates an independent automatic feed for controlling size. Conventional pushbutton or manual operation of downfeed actuates rotation of the feed screw.

By setting zero on the air gage to the mean tolerance, then setting auto-

matic feed to operate in increments of approximately one-half the tolerance limit, you can set up the machine to maintain high accuracy on an uninterrupted basis.

The planetary wheel head is designed to house either one or two spindles, depending upon production requirements. An auxiliary motor drives the spindle assembly through vee belts, while the main wheel head motor powers the spindle through a timing belt, which revolves radially as it drives.

Not only is the planetary head principle ideally suited to high production surface grinding on conventional type vertical-spindle machines, it also permits combinations of grinding with drilling, boring, reaming and tapping on such parts as electric motor frames, valve bodies, transmission housings and engine blocks. When the work is held in stationary fixtures or chucks, it is always oriented for other stations

in an index type, around-the-table, or transfer type machine requiring either vertical, horizontal or angular mounting of heads.

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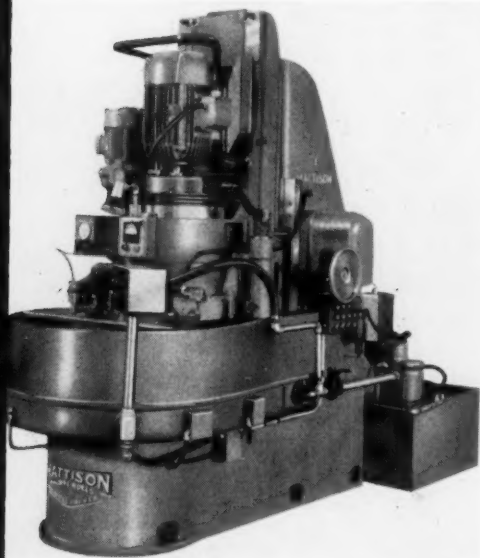
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NEW REFRACTORY MATERIAL

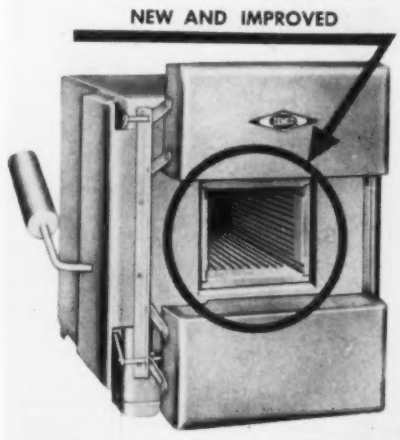
Thermolyne Corp., 488 Huff St., Dubuque, Iowa, announces that a new refractory material is being used for making embedded heating element plates and element supports in its line of Temco and Thermolyne laboratory and industrial heating equipment.

A specially selected form of a metallic oxide, in combination with certain other key ingredients, provides a chemical bond that yields the reported properties and, in addition, a high resistance to thermal shock. There are no impurities that will adversely affect element life.

The manufacturer's furnaces, hot plates, flask heaters, magnetic stirring hot plates and other products are now being supplied with refractories made of this new material. Typical is the Type 1700 Temco Furnace, which has



Mattison 24A-P Surface Grinding Machine.



View of the Type 1700 Temco Furnace.

new equipment . . .

four embedded-type element plates, as shown in the illustration.

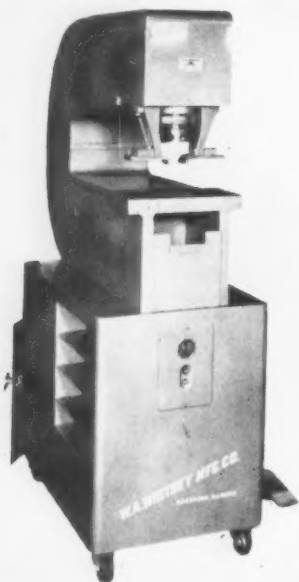
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ONLY ONE MOVING PART IN 12 TON CAPACITY HYDRAULIC PUNCH PRESS

Designed by W. A. Whitney Mfg. Co., 636 Race St., Rockford, Ill., a punch, available with a 24 or 12 inch throat depth, is designated Model 613-A and Model 612-A, respectively. The punch is actuated by a direct-acting hydraulic cylinder, the only moving part in this new cabinet-mounted press, which also features a number of other advantages.

Capacities in the units range to 4 inches through 3/32 inch mild steel



W. A. Whitney Hydraulic Punch Press.

using standard round punch and die sets, and 2 1/2 inches with standard square punch and die sets, or 9/16 inch round punch through 1/4—7/8 inch through 3/16—2 inch through 1/8 inch mild steel.

Adjustable strippers accommodate all sizes of punch and die sets up to maximum size for extra simplicity of operation.

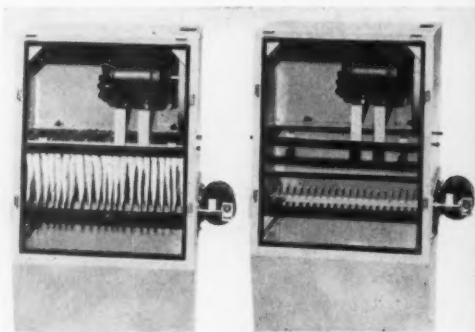
These presses are available with either 1 1/2 or 3 h.p., 1,800 r.p.m. motors, 220/440 volts. Each model delivers 1 1/2 inch strokes, 9 strokes per minute at 1 1/2 h.p., 15 strokes per minute at 3 horsepower.

For more data circle 112 on Postpaid Card

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DUST COLLECTORS FEATURE AUTOMATIC FILTER SHAKER

A newly developed, highly efficient automatic filter shaker is available on all models of cloth filter type dust collectors, made by Torit Manufacturing Co., Department 723, 1133 Rankin St., St. Paul 16, Minnesota.



Design of Torit's new automatic filter shaker is shown in this composite view of the interior of a cloth filter dust collector. The view at the right pictures the shaker bar with its metal fins, while the one at the left shows the filter bags in position. The bar is oscillated horizontally by the motor outside the cabinet, and the fins strike filters to free them of dust.

In addition to assuring peak operating efficiency by thoroughly shaking the filters each time the dust collector is used, the self-cleaning device eliminates the chance of a workman forgetting to manually shake the filters when the need arises.

The automatic shaker is powered by an independent electric motor, mounted on the side of the collector. When the shaker bar is oscillated horizontally, its metal fins strike each cloth filter bag to free the dust particles and cause them to drop into the dust tray.

Shaking action begins automatically whenever the collector motor is turned off. After shaking the filters for two minutes, the mechanism shuts itself off and will not operate again until the collector has been turned on and off again.

Available with single phase, 110 or 220 volt, 60 cycle motors, the shaker can be used regardless of the voltage of the collector.

For more data circle 113 on Postpaid Card

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PRESS HALVES TOOLING COSTS

A combination multiple slide and transfer press, which is said to cut conventional tooling costs by as much as one-half, is announced by E. W. Bliss Co., Press Div., 1375 Raff Rd., Southwest, Canton 10, Ohio. It offers outstanding economies to producers of small parts in job lot quantities.

The Bliss-Derota Press is available in capacities of 3 and 9 tons. It can blank, pierce, form and bend in one single continuous operation, at speeds up to 100 s.p.m. Tooling costs can be cut in half because tooling is divided into separate units, making it far less costly than equivalent progressive die tooling for a single slide press. This tooling feature makes the press a practical means for cost-cutting on



Bliss-Derota Multiple Slide Transfer Press

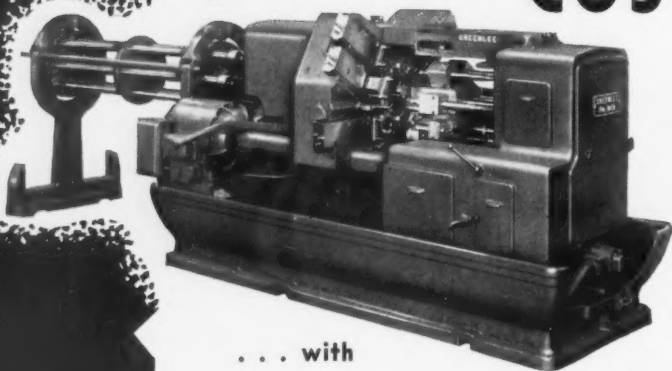
short run operations. Another advantage of the Bliss-Derota is its extremely accurate, distortion-free primary blanking, which insures accuracy. Tolerances on finished parts are not dependent on accurate feeding of strip, since the blank is separated from the strip at the first station and positively held for subsequent operations. As a result, there is no bending or twisting of the stock. Since all toolholders are individually adjustable for height, changes to new parts are easily made. For more data circle 114 on Postpaid Card

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HYDRAULIC TURRET DRILLING MACHINE

Motch & Merryweather Machinery Co., Avey Div., P. O. Box 1264, Cincinnati 1, Ohio, announces the Model 250 Turret-Dex, which is a hydraulic, six spindle turret drilling machine. With its power-indexed turret, many

BEAT rising production COSTS



... with

GREENLEE SIX-SPINDLE AUTOMATICS

- 1 CAMLESS MAIN TOOL SLIDE
- 2 QUICK SPEED AND FEED CHANGES
- 3 BUILT-IN THREADING AND FEED DRIVE
- 4 BALL-BEARING SPINDLE CONSTRUCTION
- 5 INDEPENDENT CROSS-SLIDES
- 6 WIDE OPEN TOOLING AREA



WRITE FOR
CATALOG A-405

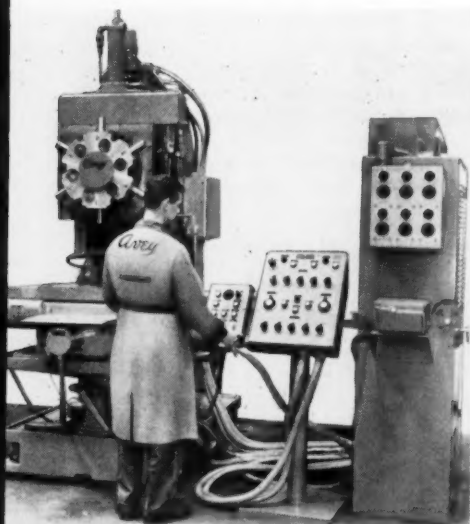
One way to boost production time is to reduce down time! Substantial savings in setup time and increased productive capacities are achieved with Greenlee Six-Spindle Automatics. Call in your Greenlee Representative. See how Greenlee Six-Spindle Automatics can help you beat rising production costs.



GREENLEE BROS. & CO.
1749 MASON AVENUE
ROCKFORD, ILLINOIS

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new equipment . . .



Model 250 Turret-Dex Hydraulic Turret Drill

different operations can be performed at one work position, such as drilling, tapping, reaming, boring, countersinking, chamfering, bottom drilling, and deep hole drilling. Drilling capacity in mild steel is $1\frac{1}{4}$ inches.

Each of the six spindles is of rigid, one piece construction, with taper roller bearings. Any spindle may be skip indexed. All spindles have automatic depth control, with a micrometer adjustment on the depth stops.

The infinitely variable feed rate is from 0 to 120 i.p.m. All speeds, feeds, rapid advance and tapping cycles can be preselected on a convenient panel. Six or 12 spindle speeds are available.

Turret clamping is automatic. Push-button indexing of the turret is automatic. Turret spindle travel is 8 inches.

Rapid traverse rate is 240 i.p.m. Clearance from spindle to table is 8 to 35 inches. Standard table size is 35 by

20 inches. However, numerical control is available with a two axis positioning table. This table is indexed by standard eight hole tape, which can be punched manually or on a special typewriter. No computer is required for tape programming.

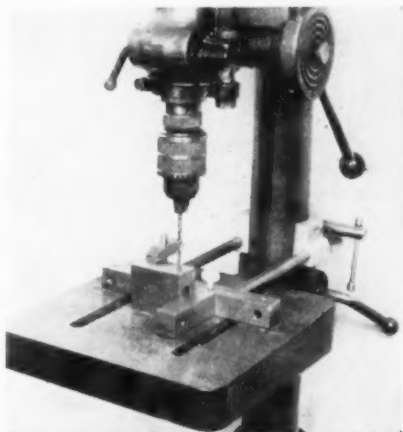
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DRILL PRESS SAFETY GUIDES

The McGonegal Mfg. Co., 135 Mozart St., East Rutherford, N. J., announces the availability of Themac Safety Guides.

These drill press safety guides incorporate the following features: prevent the common drill press accidents; safely hold work with or without jigs; single locking device for positioning; eliminate all tee bolts and clamps; attach without drilling or removing any parts of the drill press; are quickly positioned or swung clear of the table; provide accurate positioning for duplicate work; will easily hold and position



Model 2750-S Themac Safety Guide is shown mounted on a single spindle drill press with adjustable table. The Themac Safety Guide locates the work and prevents it from lifting.

new equipment . . .

a drill vise; the addition of a simple guide plate will provide an inexpensive jig for use in duplicate drilling; may be positioned on top of the work for drilling sheet metal; the stop may be positioned on either side of the workpiece.

For more data circle 116 on Postpaid Card

PUNCH PRESS FEEDS

Two models of Rapid-Air Punch Press Feeds are announced by Mechanical Tool & Eng. Co., 2323 Twenty-Third Ave., Rockford, Ill. These units are designed to feed stock 1½ inches wide in thicknesses from 0.003 to 0.050 inch.

The units repeat within an accuracy of 0.0005 inch without the use of

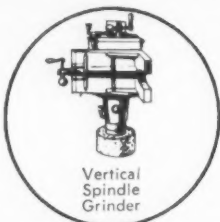
The Answer... **TO INDUSTRY'S DEMAND
FOR QUALITY, EFFICIENCY
AND LOW COST ECONOMY**
**UNITED STATES ELECTRICAL
GRINDERS-BUFFERS**



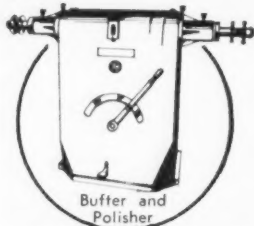
An investment in better, faster, production through the use of tools expertly designed and conscientiously crafted for your particular purpose.



General Purpose
Grinder



Vertical
Spindle
Grinder



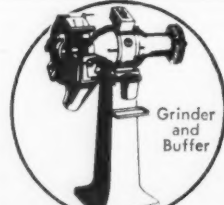
Buffer and
Polisher



Precision Lathe
Grinder



Tool Post
Grinder



Grinder
and
Buffer

"OVER 60 YEARS SERVICE TO INDUSTRY"

WRITE FOR CATALOGS

The United States Electrical Tool Co.

3640 LLEWELLYN ST.,

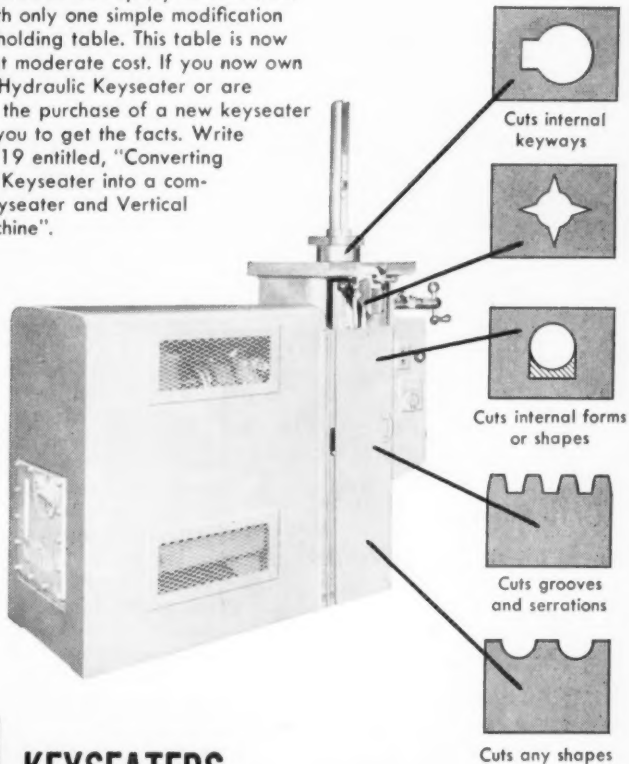
CINCINNATI 23, OHIO

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TRIPLE THE USEFULNESS OF YOUR **M & M** KEYSEATER AND VERTICAL CUTTING MACHINE

Simple modification greatly increases productive capacity of this versatile machine.

An M & M Hydraulic Keyseater is not only a keyseater that cuts internal keyways up to 5" wide but a vertical cutting machine as well. Serrations, grooves, teeth—a wide variety of cuts can be rapidly made on this machine with only one simple modification — a work-holding table. This table is now available at moderate cost. If you now own an M & M Hydraulic Keyseater or are considering the purchase of a new keyseater it will pay you to get the facts. Write for Bulletin 19 entitled, "Converting the M & M Keyseater into a combination Keyseater and Vertical Cutting Machine".



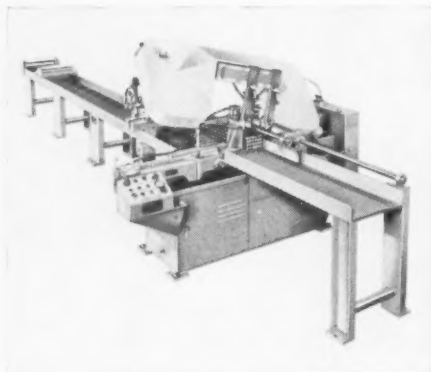
M & M KEYSEATERS AND VERTICAL CUTTING MACHINES

MITTS & MERRILL • 1006 S. WATER ST. • SAGINAW, MICHIGAN

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PRODUCTION PROVED...

**300% more efficient...
plus greater accuracy**



**Only Peerless
has these big advantages**

- Squareness of cut
- Accuracy of gauging
- Faster conveyor
- Completely automatic, also manual or four speed



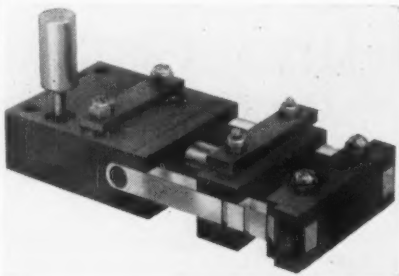
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PEERLESS MACHINE CO.
RACINE, WISCONSIN

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196 MODERN MACHINE SHOP

new equipment . . .



Rapid-Air Air Operated Punch Press Feed

pilots. This permits maximum effective use of stock.

The Rapid-Air Press Feeds are air operated and mount on the die set or bolster. Both units are 3 inches wide with a maximum height of 3½ inches.

The Model A-2 with a stroke length 0 to 2 inches, maximum speed over 200 strokes per minute, has an overall length of 7½ inches. Net weight of Model A-2 is 5½ pounds.

The Model A-4 with stroke length 0 to 4 inches, maximum speed over 150 strokes per minute, has overall length 9½ inches. Net weight of Model A-4 is 7½ pounds.

The units have a ¼ inch NPT air connection and use relatively little air in operation. They will work on an air supply range of 75 to 150 p.s.i. The stock and feed clamps are standardly furnished in steel construction. For handling extremely delicate stock, nylon faced clamps are available.

For more data circle 117 on Postpaid Card

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HAND AND POWER HACK SAWS ARE COLOR CODED

H. K. Porter Co., Inc., Disston Div., Philadelphia 35, Pa., announces a new color coding process for packaging power and hand hack saw blades.

August, 1960

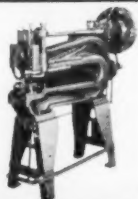
SAVAGE

NIBBLING MACHINES

- Roller-Die Type Best for Cutting Stainless Steel
- No Sparks • No Oxidation
- No Secondary Operations
- No Open Flame
- Speed • Safety
- Simplicity

DEALERS IN MAJOR CITIES

WRITE FOR BULLETIN "K"



W.J. SAVAGE COMPANY

KNOXVILLE, TENNESSEE

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The Leading Machine
Tool Manufacturers

use

RUTHMAN

GUSHER

COOLANT PUMPS

THE RUTHMAN MACHINE CO.

Model

UL 7120 1817 Reading Rd., Cincinnati 2, Ohio

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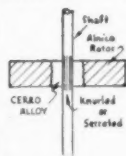
HOW TO . . . Anchor Shafts in

Alnico Rotors,

quickly and accurately

. . . with

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Permanent magnet alternator rotors are securely "keyed" to shafts with bismuth-tin alloys (CERRO ALLOYS). Low-temperature-melting CERROTRU® or CERROMATRIX® is poured into the space between shaft and oversized hole cast in rotor. An alternate method is to completely fill the cored hole with CERRO ALLOY, then drill for a press fit. The aftergrowth of the expanding, solidifying CERRO ALLOY develops a positive holding pressure . . . firmly anchoring the splined or serrated shaft and rotor.

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63 CERRO ALLOY

Applications

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*T.M. Cerro de Pasco Corporation

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Blocks

All of the precision accessories shown . . . and more, too . . . are immediately available in a wide range of standard sizes or in special sizes to specifications. Complete line of layout plates, floor plates, cast iron and black granite surface plates offered, too. Send for your FREE catalog today.

MACHINE PRODUCTS Corporation

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**"That's right, son . . . I
wouldn't change for all
the tea in China!"**

Loyalty is a common trait among Jewel Brand Abrasive Belt users. Once you've tried them, it's easy to see why. Job after job, year after year, they never let you down. Try 'em and see!



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Belts • Rolls • Sheets • Discs • Specialties

ABRASIVE PRODUCTS, INC.

South Braintree 85, Massachusetts

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Title

Company

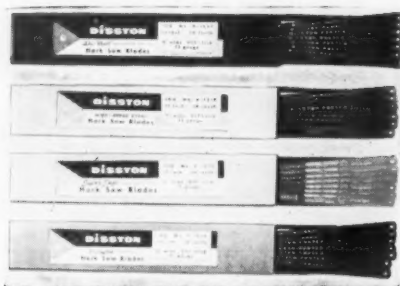
Address

City State

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198 MODERN MACHINE SHOP

new equipment . . .



Disston Hand and Power Hack Saw Blades

Designed for easy identification, this new color code eliminates waste motion. The boxes can be stacked in shelves according to color, thus enabling quick selection, in addition to a more accurate inventory control.

Five different type blades are packaged in colored boxes. Disston's Dura-flex hand hack blades are green in color and packaged in corresponding green boxes. High speed steel power and hand hack blades are gray and housed in gray boxes. Super Safe hand hack blades are tangerine and packaged in tangerine boxes. Di-Mol hand and machine blades are black and housed in black boxes. Chromol hand hack blades are packaged in buff colored boxes.

For more data circle 118 on Postpaid Card

★ modern machine shop ★

8 BY 24 INCH SURFACE GRINDER

Norton Co., Worcester 6, Mass., announces that its Type S-3 Surface Grinder is available in the 8 by 24 inch size. Like the 6 inch model, the new 8 inch surface grinder's most significant features are ease of operation and a substantial increase in table speed, which reduces grinding time as much as 50 percent over similar sized machines. Maximum

August, 1960

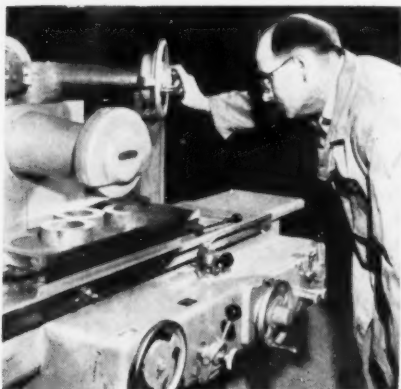
table traverse speed is 125 f.p.m. In addition to reducing grinding time, the high maximum table traverse speed helps to reduce burn, checking and cracking of the work. This advantage is particularly significant when grinding heat sensitive steels.

Another significant feature is the machine's capacity for grinding a workpiece as high as 13¾ inches under a standard 10 inch diameter grinding wheel.

As a safety feature, table traverse and cross feed handwheels are interlocked with hydraulic start-stop lever to prevent rotation of the handwheels during hydraulic powered motion. Automatic lubrication of the sliding table and saddle ways is provided as standard.

Continuous cross feed, without reciprocation of the table, is a feature which makes truing and setting-up easier. Cross feed stop dogs automatically stop the table movement, with the wheel off the work, when table cross feed reaches a preset limit. This enables an operator to set up another machine while the grinder is operating.

Wheel drive motor is 2 h.p.; hydraulic system is driven by a 1 h.p. motor. For more data circle 119 on Postpaid Card



Norton 8 Inch Type S-3 Surface Grinder

August, 1960



"I just adore the strong, silent type!"

Because they feature exclusive *Velvet Joints* which permit a smooth, even flow of cutting surfaces, Jewel Brand Abrasive Belts eliminate needless "chatter" and jumping . . . last longer under continuous operation. Try some and see!



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MODERN MACHINE SHOP 199



IT'S A FACT

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DEPEND ON DE-STA-CO

DETROIT STAMPING COMPANY

350 MIDLAND AVENUE
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For more data circle 451 on Postpaid Card

200 MODERN MACHINE SHOP

new equipment . . .



The Producto Dowel Pin Assortment Kit.

DOWEL PIN ASSORTMENT KIT

A dowel pin assortment kit, specially designed to eliminate time-consuming trips to the stock room for dowel pins, is introduced by The Producto Machine Co., 990 Housatonic Ave., Bridgeport 1, Connecticut.

The kit puts a complete "stockroom" at the bench. It contains 10 each of 16 most-used sizes of dowel pins. Dowels are contained in separate compartments for easy selection with a lift-out tray revealing the bottom section. A diagram in the box lid shows the location of each size. Refills for the assortment kit are available.

For more data circle 120 on Postpaid Card

★ modern machine shop ★

PUMPING UNIT PERFORMS DUAL FUNCTION OF COOLING AND CIRCULATING COOLANT

Where excessive heat is generated in machining, welding or electronic

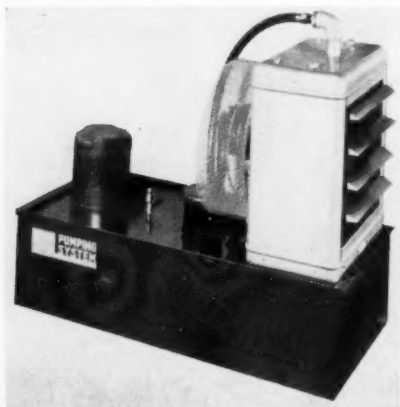
August, 1960

devices, coolants or oil may get too hot to serve effectively as a "coolant." Studies have shown that tool life on machining operations is extended when the coolant temperature is held below 90 degrees, work at this temperature is also easier to gage and handle.

Graymills Corp., 3769 North Lincoln Ave., Chicago 13, Ill., announces a unit that consists of two pumping units, one that supplies coolant to the tooling area and a second that circulates the coolant through the radiator system to reduce the temperature. It is said that use of this unit will reduce coolant temperatures by approximately 40 degrees when such temperatures appear considerably above the ambient room temperature. For example, if the coolant temperature rises to 160 degrees, it can be reduced to approximately 120 degrees. However, it will not ever reduce the temperature below the ambient room temperature.

Completely portable, this Graymills Unit can be used in conjunction with all types of machine tools. Available in a range of sizes from 5 to 40 gallons with gear or centrifugal pumps, it can be installed quickly and is virtually maintenance free.

For more data circle 121 on Postpaid Card



View shows the Graymills Pumping Unit.

August, 1960

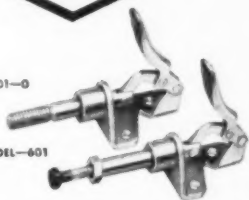


YOU CAN DO BETTER WITH



MODEL-601-0

MODEL-601



TOGGLE CLAMPS

SUCH AS the new plunger-type models 601 and 601-0 designed for light assembly work. 601 has rubber-tipped adjustment spindle for varying reach—601-0 is threaded to position holding devices easily.



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TOGGLE CLAMP CATALOG

**YOU CAN
DEPEND ON DE-STA-CO**

DETROIT STAMPING COMPANY

380 MIDLAND AVENUE
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For more data circle 452 on Postpaid Card

MODERN MACHINE SHOP 201

GUARANTEED to cut costs
PIN-MOUNT CORE DRILL

ALL NEW TWO-PIECE CORE DRILL

DESIGNED FOR

Accurate Flute
Alignment

Greater Flute
Depth

Faster Chip
Removal

Economy

Standards from $\frac{3}{4}$ " diameter in stock. Specials and carbide tipped cutters to order.

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METCUT

INDUSTRY'S FINEST END CUTTING TOOLS

METAL CUTTING TOOLS INC., Rockford, Illinois

For more data circle 453 on Postpaid Card



new equipment...

VIBRATORY BARREL TUMBLING MACHINE

Syntron Co., 309 Lexington Ave., Homer City, Pa., introduces a new concept in the art of parts finishing with the development of vibratory barrel tumbling machines, featuring electromagnetic vibratory drives for deburring, cleaning, descaling or most any parts finishing job.

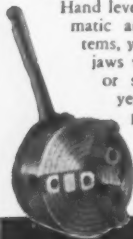
Powerful, controlled, directional vibration keeps both parts and media agitated and constantly working 100 percent of the time. This constant vibration assures more thorough working of hard-to-get-at places and shielded areas. The amplitude of vibration can be instantly varied, while the same frequency of 3,600 vibrations per minute is maintained. A turn of the

**LABOR SAVING
Production CHUCK**

Will pay for itself in 60 to 90 days

On turrets, engine lathes, cutting-off machines, drill presses or any type of chucking machine, the Barker Two-Jaw or Three-Jaw hand operated chuck will increase production up to one third and actually pay for itself while doing it in from 60 to 90 days.

Hand lever eliminates pneumatic and hydraulic systems, yet closes and locks jaws with lathe running or stopped. Over 30 years of labor saving, production boosting operation.



Top Jaws open

Hand lever closes and locks while lathe is running.



Jaws locked

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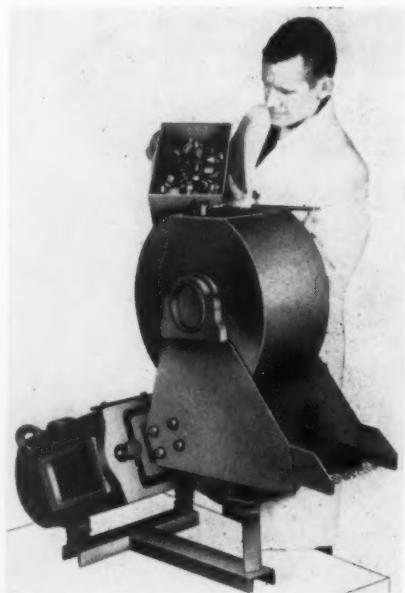
CHUCK DIVISION

THOMAS HOIST CO.

28 S. HOYNE • CHICAGO 12, ILL.

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202 MODERN MACHINE SHOP



Vibratory Barrel Tumbling Machine.

August, 1960

rheostat knob on the control box is all that is required to change the amplitude.

These self-contained, compact units are available in three models with 0.4, 1 and 6 cu. ft. barrel capacities. They are designed to reduce parts handling, incorporating a screen cover and hose connection for flushing out compounds and a screen trough to separate the parts and media. The same directional vibration, that finishes the parts, moves the parts and media across the screen dressing for rapid separation. For more data circle 122 on Postpaid Card

★ modern machine shop ★

MILLING ATTACHMENTS

The Palmgren No. 250P and No. 400P Plate Type Lathe Milling Attachments, announced by Chicago Tool and Eng. Co., 8399 South Chicago Ave., Chicago 17, Ill., are designed to hold large or irregular shaped workpieces which are difficult to hold in an ordinary vise type milling attachment.

The No. 250P has a 6 by 6 inch plate and the No. 400P Attachment has a 9 by 9 inch plate, both of which are slotted and machined. Vertical feed in thousandths is provided on each attachment by means of a micro-screw and graduated dial.

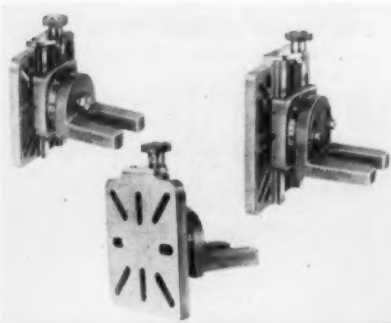
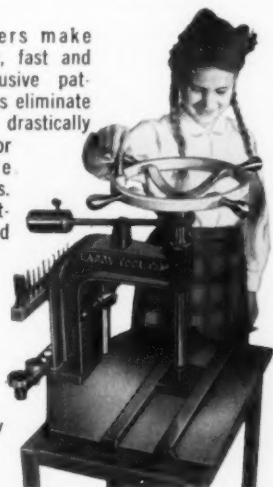


Plate Type Lathe Milling Attachments.

August, 1960

LASSY TAPPERS...

Lassy Tappers make tapping easy, fast and simple. Exclusive patented features eliminate guess work, drastically reduce labor costs, save taps. 3 Sizes. Free illustrated catalog and prices.



Unconditionally
Guaranteed

LASSY Tool Co. PLAINVILLE, CONN.

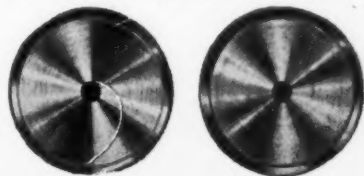
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Troubled by Withdrawal Marks?

**the new RELIEVOMATIC*
saves you costly refinishing!**

No more rejects or refinishing because of marred surfaces made by cutting tools on their return pass! Now—the RELIEVOMATIC renders precise parts with perfectly smooth surfaces. For boring, turning or facing on automatic metal turning equipment.

Write for complete technical literature.



normal marred surface

perfectly clear surface
with RELIEVOMATIC!

* U. S. Patent No. 2,712,767

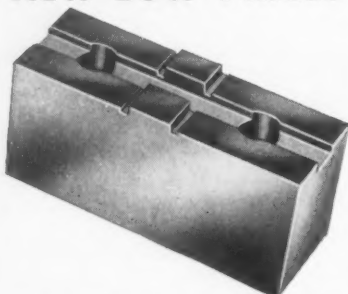
SILBER PRODUCTS, INC.

870 ESSEX STREET • BROOKLYN 8, N. Y.
Nightingale 9-8600

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MODERN MACHINE SHOP 203

NEW LOW PRICES



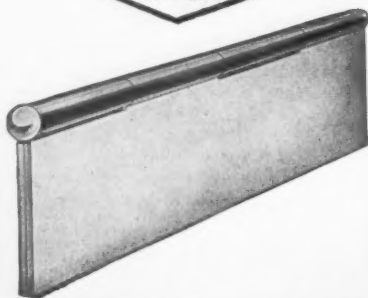
SOFT BLANK TOP-JAWS TO FIT AMERICAN STANDARD CHUCKS

Medium Duty Standard Height	Price per 3-jaw set
For 6" Chuck - - - - -	\$ 7.50
For 8" Chuck - - - - -	8.25
For 10" Chuck - - - - -	9.75
For 12" Chuck - - - - -	11.50
For 15" Chuck - - - - -	14.25
For 18" Chuck - - - - -	16.25

Heavy Duty & Extra Height at similarly low prices

DU PAGE MACHINE CO. Write for Catalog
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Phone: Lombard, Ill., MAYfair 7-1027

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& MFG. CO.**

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204 MODERN MACHINE SHOP

new equipment . . .

Speed and ease of attachment are distinct advantages of the Palmgren Milling Attachment. Remove the tool post ring, fit the U shaped base of the milling attachment around the tool post and tighten the tool post screw in the same way as with any other lathe tool.

For more data circle 123 on Postpaid Card

★ modern machine shop ★

HIGH ACCURACY, LARGE CAPACITY, TORQUE WRENCH CALIBRATOR

Designed to rapidly load and read out the actual "break-away" value of torque wrenches of any design, the Model TWC-139 torque wrench calibrator, developed by Steel City Testing Machines, Inc., 8817 Lyndon Ave., Detroit 38, Mich., uses a conventional proving ring as a load measuring standard. For most torque wrench designs, operation is automatic. The wrench is inserted in the mechanism, and load links and range of the electronic digital counter are set for the correct range. The tang is rotated by a hydraulic piston and cylinder assembly. At the break-away point of the wrench, the counter displays the torque value in either inch-pounds or foot-pounds.

The digital counter translates the linear displacement of the proving ring

JIG GRINDING and JIG BORING to your specification

At your disposal: Our sub-contract jig boring department, one of the best equipped in the East.

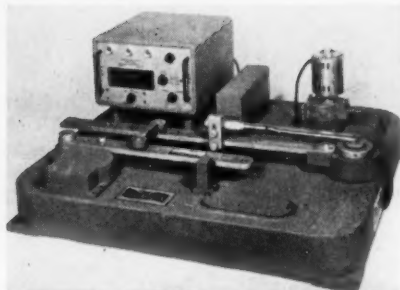
A. K. TOOL CO., INC.

ROUTE 22, MOUNTAINSIDE, N. J.

Telephone: ADams 7-7100, DIgby 9-1445, N. Y. C.

For more data circle 459 on Postpaid Card

August, 1960



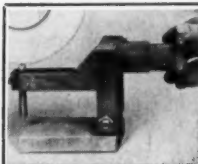
Average size torque wrench is shown above in position for calibration on Steel City Model TWC-139 torque-wrench calibrator.

into torque values with a calibration accuracy of 0.4 percent of full scale. It can calibrate torque wrenches with capacities from 20 inch-pounds to 2,000 foot-pounds.

An adjustable thrust arm can be positioned for any usual length of torque wrench, and four interchangeable socket inserts accommodate standard wrench tangs.

Dial or clock type torque wrenches that do not "snap" at the set torque cannot be checked automatically on this unit, but they can be manually calibrated. Accuracy is not impaired by manual operation and calibration can be accomplished quickly by an operator with a minimum of training.

The four ranges of this instrument are: 20-1,000 and 1,000-5,000 inch-



Low Price—\$124.50
Includes Diamond

NEW 1960 MODEL "SS" RADIUS DRESSER

Newly engineered and redesigned after 19 years of field testing. Convex, concave, or complex combination shapes are dressed quickly and easily by even inexperienced operators. Accuracy to .0002". Dresses all wheels up to 12" diameter.

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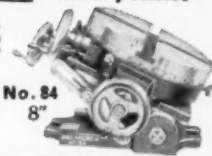
SOMERSET TOOL CO. 320 Virginia St.
Hillside, N. J.

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August, 1960

PALMGREN Machine Vises and Rotary Tables

There are 64 different models and types of Palmgren vises, rotary tables, milling attachments and other machine tool accessories—the most complete line of vises and tables available anywhere.



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8"

TILTING, INDEXING
and ROTARY TABLE \$139.50



No. 60B 6"
SWIVEL MACHINE VISE \$119.95

Used in all industries—everywhere.

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8399 S. Chicago Ave., Chicago 17, Ill.

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MODERN MACHINE SHOP 205

new equipment . . .

pounds, and 1,500 and 500-2,000 foot-pounds. The calibrator requires a bench space of 32 by 36 inches and has a shipping weight of approximately 250 pounds.

For more data circle 124 on Postpaid Card

★ modern machine shop ★

ULTRASONIC MACHINE TOOL

The Sheffield Corp., Dayton 1, Ohio, announces a new model ultrasonic machine tool for precise machining operations in hard and brittle materials, including dicing of germanium and silicon wafers and other semiconductor materials.

The compact, space-saving machine enables small companies and research and development laboratories to obtain a low cost ultrasonic machine tool, suitable for low production require-

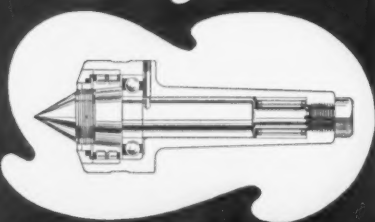


The Sheffield Ultrasonic Machine Tool

ments which also has built-in capacity to handle high production as the need arises.

For low production, the transducer and work station are mounted horizontally, as illustrated. Less than 9 by 36 inches of space is required. The work-piece is fed into the ultrasonic tool, oscillating 20,000 times a second under

NIELSEN *Heavy Duty* *Live Centers*



Adapted for heavy duty work. Precision type ball and roller bearings assure maximum capacity for high speed production and long service.

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NIELSEN, INC. LAWTON, MICHIGAN

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206 MODERN MACHINE SHOP



MACHINE KEYS



Our ability to furnish machine keys of every variety and from a wide range of materials is unsurpassed. Standard gib head keys, $\frac{1}{8}$ " taper in 12", are carried in stock in C-1018 Carbon Steel. In addition we can furnish plain taper keys, straight keys, round and feather keys, lift keys and many other varieties, upon request. All keys are made uniform to exacting tolerances. For your special needs we will gladly quote upon request. Send for new catalog giving complete information on Woodruff keys, taper pins, machine keys and gear rack.

STANDARD STEEL SPECIALTY CO.

BEAVER FALLS

PENNSYLVANIA

Plants: Beaver Falls, Pa.; Hammond, Ind.

For more data circle 464 on Postpaid Card

August, 1960

controlled spring tension. Machining tools up to 2 inches in diameter can be used.

For high production, the transducer is mounted vertically and a specially designed adapter, attached to the transducer, transmits the high frequency vibrations to up to eight individual tools fastened radially to the outer edge. A work station of the same type shown is opposite each tool. The eight stations can be operated simultaneously or independently.

The standard machine is powered with a 1,000 watt electronic generator. In applications where it is desirable to have power sufficient to drive only one machining station, a 200 watt generator can be supplied.

Used as a single station machine, the unit is capable of machining as many as 300 dice (0.030 by 0.010 thick) in a 1 inch diameter wafer in less than 45 seconds.

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TRIPLE-PURPOSE POWER TRANSMISSION ACCESSORY

Serving three purposes in electric or gasoline engine drives, "Power-Max" combines an automatic clutch, adjustable torque selector and variable starting time delay. Available in sizes from 3 to 2,000 h.p. capacity, the drive unit is said to eliminate the need for oversize and special type motors, expensive starters and, at the same time, protects the power unit and the driven mechanism.

Power-Max is a centrifugally operated clutch, which may be adjusted both for maximum torque transmitted and time delay in "picking-up" the driven load.

A unique feature is the fact that, with Power-Max, "starting load" is completely eliminated, even in applications normally having exceptional starting loads. Power requirements never exceed the normal running load.

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is more modern than ...

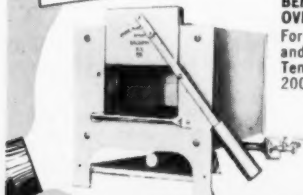
is more economical than ...

GAS

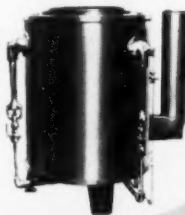


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For cyanide, salt bath and lead hardening. Temperatures to 1650° F.

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"BUZZER" Burners & Furnaces for Heat Treating, Melting, Soldering

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new equipment . . .

In many applications, this feature alone repays the cost of the device in savings on the cost of high torque motors, special starters and extra electrical service required only for starting loads.

The Power-Max unit, manufactured by Olme Precision, Inc., 451 Masonic

"TORQUE WRENCH" MANUAL

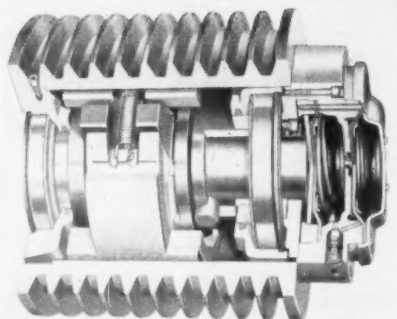
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Formulas
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Adapter problems
General principle

P.A. STURTEVANT CO.
ADDISON QUALITY ILLINOIS

Manufacturers of over 85% of the torque wrenches used in industry

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"Power-Max" Transmission Accessory.

Building, Portsmouth, Ohio, gives smooth start and gradual acceleration, absorbing shocks. If an overload occurs in the driven mechanism, the unit "soaks up" the overload, preventing damage to the entire mechanism, since it can be set not to exceed a predetermined torque transmission.

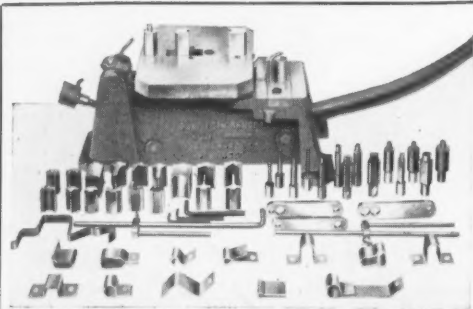
Typical installations include conveyors, punch presses, rolling mills, winches, elevators, hoists and virtually any drive where high starting torque, shock loads or other requirements are found.

For more data circle 126 on Postpaid Card

★ modern machine shop ★

LINEAR VERNIER CALIPERS

Titan Tool Supply Co., Box B, 1419 Hertel Ave., Buffalo 16, N. Y., and



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Users report the Multiform Bender one of the handiest tools in the shop. No special tooling . . . Bends, Cuts, Punches, Flats, Rounds into Any Shape, Brackets, Springs, Busbars, Wire Forms, Aircraft Work, and Steel Rule Dies for Metal Blanking.

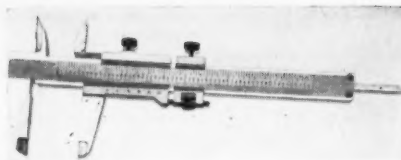
**AIR OR HAND MODELS FOR UP TO
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Write for brochure which illustrates and describes the four bender models.

J. A. RICHARDS CO.

Dept. 6-M Kalamazoo, Mich.

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View of Titan Linear Vernier Caliper

nounces a line of linear vernier calipers. Precision made from stainless steel, hardened and lapped throughout, they are ideal for toolmakers, machinists and inspectors. The vernier scale is deeply engraved for maximum contrast against the satin finish scale for easier reading. This reduces fatigue and the chance of human error. A micro-positioning feature simplifies adjustment of the measuring head for faster, more accurate measurement. Ample length of the vernier head insures positive scale alignment of the head and the scale beam for absolute freedom from distortion.

The calipers feature a double vernier scale, which reads either 1/1000 or 1/128 inch, with an accuracy of 1/1000 inch. The No. 244 Caliper has a 6 inch scale with effective measuring range of 5 inches. Its double jaws permit convenient inside or outside measurement from the same scale.

All calipers are supplied in a durable, transparent, rigid plastic case. For more data circle 127 on Postpaid Card

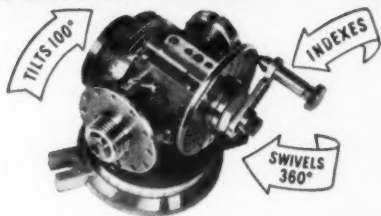
★ modern machine shop ★

NEW SPINDLE ASSEMBLIES FOR TURRET DRILLING HEADS

Chicago Quadrill Co., 1854 Busse Highway, Des Plaines, Ill., announces new precision spindle assemblies as standard equipment on all models of four and five position turret drilling heads. Each spindle is mounted on two preloaded ball bearings, featuring zero clearances designed for greater rigidity, accuracy and longer life.

August, 1960

VERSATILITY



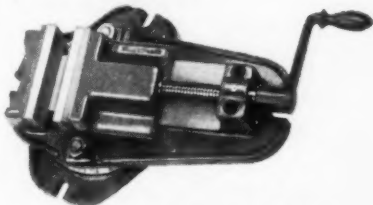
DIVIDING HEADS

6½" or 8" swing

Swivels in 2 planes

Holds work between centers, in chucks and collets.

ACCURACY



5" MACHINE VISE

Plain or swivel base

Precision ground screw

V-slides with adjustable gibs

Oil hardened and ground jaws

ECONOMY

Save time and money with Ellis tools. Write:

NICHOLS-MORRIS

CORPORATION

76-H MAMARONECK AVENUE

WHITE PLAINS, N.Y.

For more data circle 468 on Postpaid Card

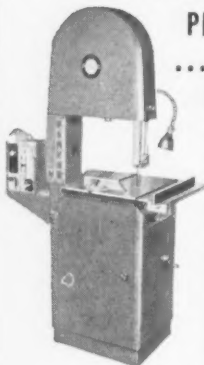
MODERN MACHINE SHOP 209

The Universal Cutting Machine **PARKS M-2 18" Band Saw**

Cuts **METALS - ALLOYS**

PLASTICS - WOOD

**...and it costs
less than \$500!**



Here is a rugged, precision-built machine that will cut any materials you work... at the speed best suited for that material—from 50 to 4200 F.P.M. Dual-Range, fully variable gear drive. Priced to fit any shop budget. Write for literature on band saws, wood planers, and radial saws.

The PARKS Woodworking Machine Co.

1511 KNOWLTON ST., CINCINNATI 23, OHIO

Manufacturers of Quality Machines Since 1887

For more data circle 469 on Postpaid Card

WALLS TU-WAY BELT SANDER

**USE IT
EITHER WAY**

Full
1/3 h.p.
G. E. Motor



HORIZONTAL

VERTICAL

At last, a top quality industrial sander that provides all the most wanted features—yet sells for so little. **\$89.95** complete—with cord, plug, switch ready to use

Illustrated Literature on Request

A few desirable distributor territories still available.

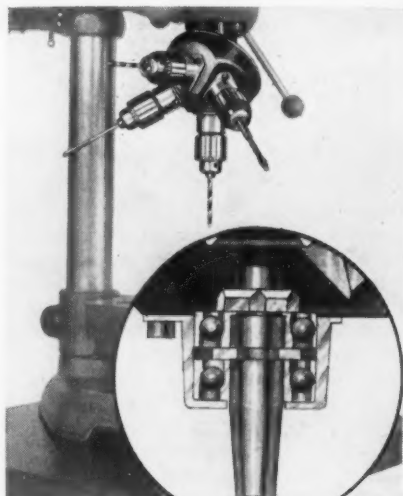
WALLS SALES CORPORATION

333 Nassau Avenue Brooklyn 22, N. Y.

For more data circle 470 on Postpaid Card

210 MODERN MACHINE SHOP

new equipment...



Spindle Assembly for Quadrill Heads.

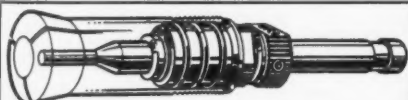
The newly improved Quadrills quickly convert practically any drill press into a precision turret drilling machine for very little cost.

For more data circle 128 on Postpaid Card

★ modern machine shop ★

SPEED REDUCERS

Boston Gear Works, 68 Hayward St., Quincy 71, Mass., announces that the new Model 221 Optimount Reduc-



NEW! Self-Centering 5C Collet Stop

Quick friction adjustment. Stays in fixed position. Will not distort collet. Will not move back. Also available for other collets and spindles. 30 days Free Trial. Several Territories Open for Distributors.

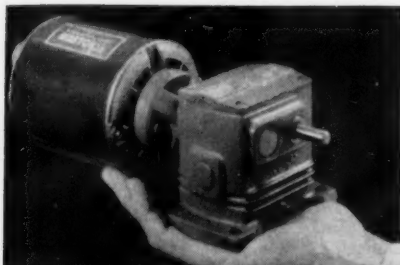
Write for Bulletin

THE BYSTROM COMPANY

6106 Park Ave. So. Minneapolis 17, Minn.

For more data circle 471 on Postpaid Card

August, 1960



(Above) MW109 Boston Gear Motorized Speed Reducer, (Below) 221 Optimount.

tors and Ratiomotors extend the ratings of these helical geared speed reducers to meet increasing needs for drives in the lower power range. Like the larger Optimount models, the 221 size is available horizontal or vertical base mounted or shaft-mounted—to meet any mounting conditions.

The new MW109 Ratiomotor, offering a broad selection of low output speeds, is a standard stock model. A

**LONGER TOOL LIFE & SMOOTHER FINISHES
WHEN YOU TAP & THREAD WITH**

EEZ #215-T

**A NON DRYING, NON TOXIC, E.P. LUBRICANT.
PROVE IT WITH A FREE SAMPLE.**

LEONARD SMITH, INC.

2915 Independence Rd. Cleveland 13, Ohio

For more data circle 472 on Postpaid Card
August, 1960

Another

VICTOR VALUE

TOP QUALITY—LOWEST PRICES

Our Special Import . . .

DIAMOND WHEEL DRESSERS

Made of selected, full individual stones, mounted in 7/16" diameter x 6" long cold rolled shank.

Karat	Regular Price	Our New Price
1/4	\$ 6.00	\$ 2.85
1/2	12.00	5.00
3/4	21.00	7.50
1	30.00	10.25
1 1/2	54.00	15.00
2	75.00	20.00
2 1/2	102.00	26.00
3	130.00	32.00

These diamonds can be set in any shank to your specifications for \$1.00 each extra.

Order Today—Immediate Shipment from Stock!

VICTOR MACHINERY EXCHANGE, INC.

Dealers in Tool Room Equipment

Dept. B, 251 Centre St.

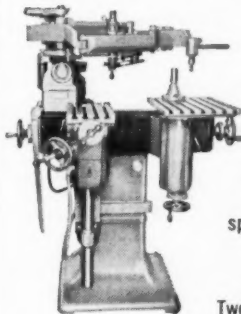
New York 13, N. Y. Tel.: CAral 6-5575



For more data circle 473 on Postpaid Card

ALEXANDER

**die sinkers
for 2 or 3 dimensional
work**



Latest model,
No. 3A for
molds and
dies up to
1000 lbs.
Ratios from
1.5:1 to 10:1,
14 spindle
speeds from 475
to 9500 rpm,
cutters up to
3/8" dia.
Two smaller sizes,
1A and 2A.

Write for Catalog C
on these quality, British machines.

J. ARTHUR DEAKIN, INC.

31 Roseland Ave. • Caldwell, N. J.

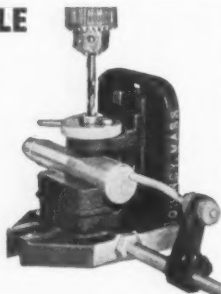
For more data circle 474 on Postpaid Card
MODERN MACHINE SHOP 211

new equipment . . .

worm-gear, horizontal parallel drive model, the MW109 is powered by specially designed 1/20 or 0.035 h.p. motors and provides output speeds from 1.9 to 70 revolutions per minute. For more data circle 129 on Postpaid Card

ADJUSTABLE DRILL JIG

- eliminates layout
- cuts drilling time



Used for drilling holes through round stock and hex stock from $\frac{1}{4}$ " to 2" and cap screws from $\frac{1}{4}$ " to $1\frac{1}{4}$ ", the new Mathewson Adjustable Drill Jig eliminates layout and can cut drilling time on small lots to a fraction. And it eliminates the costs of special jigs for larger quantities. • Holes for cotter pins, set screws, drive pins for bayonet joints, oil holes in tubular sections, and wiring holes in cap screws, are all typical of the operations that can be done more economically with this jig. Hole diameters range from .052" to .531", using your A.S.A. standard slip bushings. • The hardened V-block has two 60-degree V's for centering round or hexagonal stock, one for $\frac{1}{4}$ " to $21/32$ " diameter, one for $21/32$ " to 2" diameter. Adjustable stop for locating work longitudinally for drilling any distance from end, may be used on either side. Adjustable bushing carriers hold slip bushings and clamp work securely. • Jig highly successful in permitting use of inexperienced drill operators. For circular write to: **Mathewson Machine Works, 40 Hancock St., Quincy 71, Mass.**

For more data circle 475 on Postpaid Card



Molykote Lubricating Sticks in slide boxes.

DRY STICK LUBRICATES CUTTING TOOLS, SLIDING SURFACES, PRECISION MECHANISMS

Extreme-pressure molybdenum disulfide dry lubricant in stick form is now available from The Alpha-Molykote Corp., 65 Harvard Ave., Stamford, Conn. Resin bonded for greater strength, the Molykote Lubricating Stick permits easy application of a lubricating film to cutting and shaping tools, sliding areas of small and medium size machine parts, or wherever metallic dry friction occurs on sliding surfaces. Application is simple—the stick is just rubbed firmly over the cleaned surface.

The Molykote Lubricating Stick has been used to considerable advantage on metal cutting tools such as taps, dies, gear shapers, planers and milling cutters, where no cutting fluid



SPELLMACO "SPOTTERS"

**A matched set of transfer punches
for toolmakers, machinists and tool cribs**

Used for transferring location of threaded, drilled and reamed holes, slugs, blanks, etc.

Precision made of finest tool steel—Carefully heat treated and tempered for long life—.0025 undersize to facilitate use—Black oxide finish.

SET #3-17; 28 punches with indexed stand—sizes $\frac{3}{32}$ " to $\frac{1}{2}$ ", by $\frac{1}{4}$ "—plus handy $1\frac{1}{32}$ " size. Length $4\frac{7}{8}$ ". ONLY \$19.40.

Single sizes available

R. L. SPELLMAN CO. • URBANA, OHIO

For more data circle 476 on Postpaid Card

is employed; also on tools and paper cutting blades. With proper application, the life of the cutting tool is frequently doubled, or more. Cutting tools rubbed with the stick produce clean cuts, low cutting temperatures, show less tendency to build up on edges and stay sharp longer.

Molykote Lubricating Sticks are also useful on small surfaces where oil cannot be used because of contamination or temperature restrictions, as on small parts of precision mechanisms, optical instruments and automation equipment.

Because of its physical strength, the stick can even be formed in any desired size for use as an element in the bearings of small machines, ways and light equipment undergoing oscillating movements.

Molykote Lubricating Sticks are available in slide boxes containing five or ten sticks.

For more data circle 130 on Postpaid Card

VERTICAL PNEUMATIC GRINDERS

Compact and powerful vertical pneumatic grinders in spindle and collet chuck models are introduced by Thomas C. Wilson, Inc., 21-11 Forty-Fourth Ave., Long Island City 1, N. Y. Series 923 Vertical Grinders are used for flash removal, snagging, weld smoothing and other metal removing operations. Collet chuck models are for use with burs, mounted grinding wheels and other mounted accessories. Series 923 Grinders are particularly suited for metal removal in deep cavity molds and other hard-to-get-at places. Weight is 2 pounds.

The threaded spindle model operates at 18,000 r.p.m., for use with 3 inch diameter depressed-center wheel, $\frac{1}{8}$, $\frac{3}{16}$ or $\frac{1}{4}$ inch thick with $\frac{3}{8}$ inch arbor hole. The collet chuck vertical grinder is available with speeds of 18,000, 20,000 or 22,000 r.p.m., with $\frac{1}{4}$, $\frac{3}{16}$ or $\frac{1}{8}$ inch collets.



Gage Block Precision means
GRADE "A" ACCURACY*

with **ULTRA-CHEX**
GAGE BLOCKS

82 PIECE SET...

NOW ONLY \$249⁵⁰

*Grade "A" Accuracy: $-.000002''$ and $+.000006''$

For Complete Information request our 96 Page Catalog —
Contact any of our 4 "Coast to Coast" Locations or your
nearest Local Distributor.



**SCHERR
TUMICO**

**PRECISION MEASURING
TOOLS AND INSTRUMENTS**

WAREHOUSE STOCK, SHOWROOMS & SALES OFFICES AT
NEW YORK: 200 Lafayette Street, New York 12, N. Y.
ST. JAMES: St. James, Minnesota
LOS ANGELES: 3337 West Olympic Blvd., Los Angeles 19, Cal.
CHICAGO: 5045 W. Harrison, Chicago 44, Ill.

When writing to any of the above locations, refer to DEPT C-8

For more data circle 477 on Postpaid Card

new equipment . . .

Features of the Series 923 vertical grinders include swiveling hose for free maneuverability, three bladed swastika-type motor, built-in speed regulator, lever throttle with safety lock and hardened, ground and honed

Spra-Kool

**MIDGET
MIST-COOLANT
GENERATOR**

\$995

Complete
**GUARANTEED
PERFORMANCE**

Order Sample or Write for Bulletin

BAR PRODUCTS CO.

4803 WHITE OAKS AVE. ROCKFORD, ILL.



For more data circle 478 on Postpaid Card

CAMS

MADE TO YOUR SPECIFICATIONS

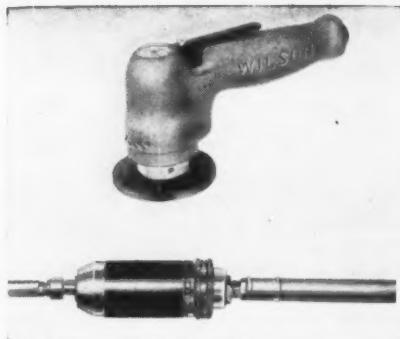
—Except Screw Machine Cams—

Design Assistance Offered

KIDDE PRECISION TOOL CORP.

15 LOCUST AVENUE ROSELAND, N. J.

For more data circle 479 on Postpaid Card



(Above) Vertical Pneumatic Grinder, and
(Below) Small Wheel Pneumatic Grinder.



cylinder for longer wear. The grinders are economical to operate, cool running and free from vibration.

Small wheel pneumatic grinders, adjustable to any operating speed between 16,000 and 25,000 r.p.m., have been developed by Thomas C. Wilson, Inc. The adjustable speed feature permits the grinder to be operated at the optimum tool speed for each different workpiece material, including plastics, aluminum and other non-ferrous metals, steels of different hardness, stainless steels and so on, for improved finish, tool life and increased productivity. Operating speed is set by rotation of a calibrated ring throttle speed regulator.

For more data circle 131 on Postpaid Card



*You Need an Extra Hand Now
to Speed Up Production!*

HEIMMANN TRANSFER SCREW SETS

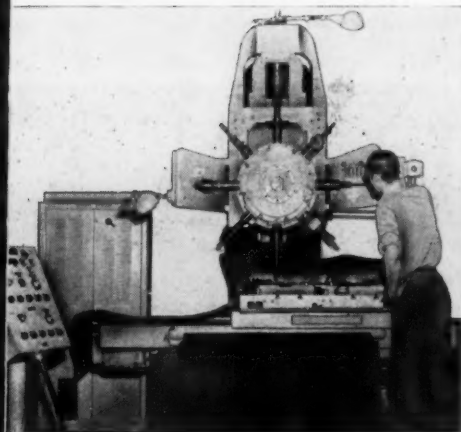
Here is the faster, more precise way of transferring open and blind screw holes—make savings in "wage-dollars-per hour" of your expensive hands on every job. A die-and-tool maker's tool with many other applications for die makers and machinists. A set of 6 Hardened Screws nested in combination holder and wrench—no other tools needed. Get more work now—save money tool

IN 11 SIZES—No. 6 to 1"
N.C. In all S.A.E. sizes.



HEIMMANN MFG., CO. • URBANA, OHIO

For more data circle 480 on Postpaid Card



Reciprocating Feed Arrangement for drill.

RECIPROCATING FEED ARRANGEMENT FOR DEEP HOLE DRILLING

A reciprocating feed arrangement, which is available as optional equipment for deep hole drilling on all automatic hydraulic and tape controlled Burgmaster Turret Drilling Machines, was recently announced by Burg Tool Mfg. Co., Inc., 15001 South Figueroa Street, Box 311, Gardena, California.

The feed arrangement permits drilling to a certain depth, retracting to the top of the workpiece, rapid traversing down to the previous stopping point of the drill, drilling another increment (if so desired), retracting to the top of the work to clear chips and then continuing on down in this manner until the final depth has been reached.

At this point, the drill is rapid traversed to the top of the stroke, it is then indexed to the following tool and subsequently continues the machining cycle.

For more data circle 132 on Postpaid Card

4 Reasons why you should use **GAMMONS DIE REAMERS**



Specially treated for
today's modern die
steels.



Rapid cutting capacity.



Tapers per inch .003,
—.008, —.013 in stock.



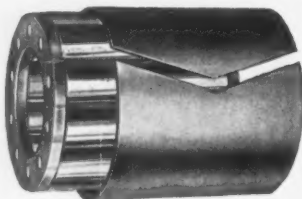
Large range of stand-
ard sizes in stock at all
times for your conveni-
ence.

WRITE FOR
COMPLETE INFORMATION

GAMMONS • HOAGLUND CO.

MANCHESTER 2, CONN.
Manufacturers of helical taper pins, chucking
die makers and special reamers.

For more data circle 481 on Postpaid Card
MODERN MACHINE SHOP 215



TYPE GC

INDUSTRIAL ROLLER BEARING

STANDARD SIZES ARE SHOWN IN OUR
GENERAL CATALOG SENT UPON REQUEST.
SPECIAL SIZES TO ORDER.

... ALSO METAL BALLS ...

THE GWILLIAM COMPANY

Incorporated 1912

358 FURMAN ST. BROOKLYN 1, N. Y.

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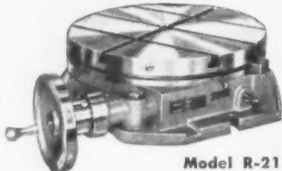
TROYKE

ROTARY TABLES

New
Design

Greater
Precision

Greater
Rigidity



Model R-21

6 Sizes • 8 Models

Guaranteed 60 seconds or less total
accumulative angular error. (60 sec-
onds equals .00087" at 6" diameter.)

Write for FREE Catalog Number 23.



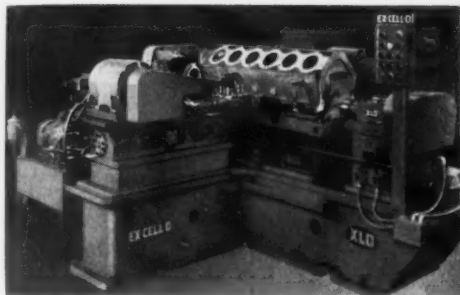
TROYKE MFG. CO.

11296 Orchard Street
Cincinnati 41 (Sharonville), Ohio

For more data circle 483 on Postpaid Card

216 MODERN MACHINE SHOP

new equipment . . .



Ex-Cell-O Custom Precision Boring Machine

BUILDING BLOCK CONSTRUCTION PRODUCES UNIQUE CUSTOM MACHINE

A custom precision boring machine has been developed by Ex-Cell-O Corp., Detroit 32, Mich., using standard machine slides and other building block components, including a total of eight precision boring spindles.

The workpiece, a massive aluminum alloy V-12 engine crankcase is manually clamped on the fixture table, this being carried on a standard hydraulic slide. Two other standard slides are used to feed boring and facing heads toward the part. These latter slides rapid into cutting position at the start of the machining cycle. The slide carrying the fixture table feeds from

C A M S

Fully equipped modern machine shop with
extensive Jig Boring, Surface Grinding,
Horizontal Boring and Thread Grinding
facilities as well as modern Cam Milling
and Cam Grinding equipment.

Your Inquiries Answered Promptly

HIMOFF MACHINE CO., INC

23-16 44th Road Long Island City 1, N. Y.

For more data circle 484 on Postpaid Card

August, 1960

left to right toward the facing heads. This action also feeds the workpiece toward spindles at the right hand station where two dowel holes are bored and chamfered. In order to extend tool life, an air operated, retractable boring tool is provided on each of these spindles to enable tools to withdraw after their cut is complete.

The machining cycle continues as the fixture rapids to the left, feeding toward the four spindles mounted at that end. After completion of boring and chamfering operations on this front face, the two cross slides retract clear of the fixture table, which now returns to the start position. During the cycle, 37 individual cutting operations are performed.

For more data circle 133 on Postpaid Card

★ modern machine shop ★

PRESSURE INDICATOR

Barber-Colman Co., Wheelco Instruments Div., 64 Loomis St., Rockford, Ill., introduces a new pressure indicator. Styled in the manner of the "400" Series, the new instrument incorporates a measuring system and d.c. power supply in a single integral unit. A Zener diode circuit is used to regulate the voltage. The zero and span adjustment can be conveniently adjusted from the power chassis of the instrument.

The plug-in type measuring system is essentially a d'Arsonval movement



.0003 HOLE LOCATION IN ONE MINUTE

Thousands of companies and individuals have proven and accepted our EDGE FINDERS for years. Ask for literature with users list and dealer in your area. Hardened and ground on all surfaces including contours for balance. Deluxe .200" Edge Finder \$10.00. Vise stop for holding same hole location in several pieces \$2.95.

Above Postpaid Except C.O.D. Charges
OPTICAL TANGENT ANGLE & RADIUS
DRESSER \$285.00.

1° TO 90° MAGNETIC ANGLE SQ. PIN ANY
DIRECTION BLOCK SET, \$198.00.

GLOVER MFG. CO.
423 PARK AVENUE MEADVILLE, PA.

For more data circle 485 on Postpaid Card

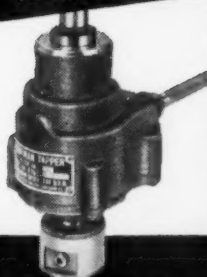
August, 1960

DORMAN

automatic reverse

TAPPERS

convert any drill press
to tapping



IMMEDIATE DELIVERY!

priced from \$65

- Fast, LOW COST tapping
- Automatic torque control
- 1 Minute to attach or remove
- Assures precision threads
- 4 sizes...capacities #2-56 to 2"
- Adapts to external threading
- Taps most metals and materials
- Takes wide range of taps
- Easy to tap...no skill required
- Time savers...money makers

Bulletin FREE for the asking!

THRIFTMASTER

PRODUCTS CORPORATION

1030 North Plum St., Lancaster, Penna.

Also headquarters for Adj. & Fixed Center Drillheads
Subsidiary of Thomson Industries, Inc., makers of
BALL BUSHINGS, MYLINED Bearings, 60 Case Shifting

For more data circle 486 on Postpaid Card

MODERN MACHINE SHOP 217

LINLEY RIVETERS



**spin rivets
noiselessly
at low cost**

Speed your riveting production with Linley Noiseless Riveters. We'll give you, without obligation, cost and time estimates of doing it the Linley way if you'll send us samples of parts to be riveted.

Linley Riveters will do rivets up to $\frac{3}{8}$ " in diameter in iron and cold rolled steel; larger sizes in brass, aluminum, etc.

Send for Bulletin R Today.

LINLEY BROTHERS CO.

Also Builders of JIG BORERS
671 State St. Ext., Bridgeport 1, Conn.

For more data circle 487 on Postpaid Card

KEO



COMBINED DRILLS and COUNTERSINKS

• Both old and new series carried in stock for immediate delivery. Finest high speed steel. Ground spiral flutes. New standard simplifies and improves size progression. New comparison chart mailed on request. Shows new standard sizes—both plain and bell type. Specials to your blue prints. We also stock Keyseat Cutters, Arbor Type Cutters, Center Reamers, Lathe Mandrels, T-Slot Cutters and Long Series Combined Drills.

KEO CUTTERS, INC.

25040 Easy St., Warren, Mich.
Warehouse: 1300 S. Soto St.,
Los Angeles 23, Cal.

For more data circle 488 on Postpaid Card

new equipment . . .



Wheelco 400 Series Pressure Indicator.

compensated for ambient temperature conditions. A linear scale is used. The full scale span in millivolts is between 4.9 and 5.5.

Plug-in type control chassis may be used as part of this product, where pressure control is required, thus making it an indicating pressure controller.

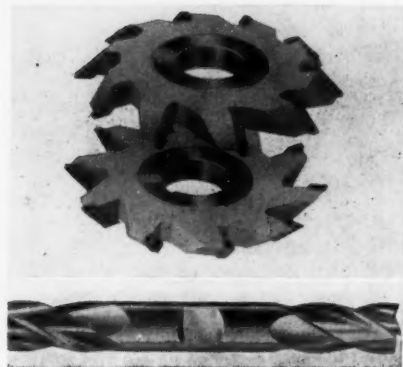
Two models of the "400" Series Pressure Indicator are available, the 430A and the 430B. Model 430A is used with transducers such as the Dynisco PT58 and the CEC unit. Model 430B with a power output of 11.6 volts is used with the Taber and Norwood transducers.

For more data circle 134 on Postpaid Card

★ modern machine shop ★

CARBIDE TIPPED ANGULAR CUTTERS AND END MILLS

Brown & Sharpe Mfg. Co., Cutting Tool Div., Providence 1, R. I., announces a Nelco Carbide Tipped Angular Cutter, that is designed for



(Above) Angular Cutters, (Below) Thriftmill

milling angular grooves and dovetails.

This 45 degree angular cutter has generous carbide tips to facilitate regrounding without grinding steel cutter body. Available with two carbide grades, the Series 200 is recommended for steel and the Series 300 is recommended for angular grooves and dovetails in cast iron, brass, bronze and similar non-ferrous materials.

Designed for use on arbor, the teeth have 0 degree rake and the cutter may be ordered with keyway in line with teeth or halfway between teeth for interlocking or ganging with Nelco carbide tipped side mills, slab mills and saws for multiple milling operations. Chamfer on outer diameter is 1/64 inch maximum and tolerances

READ TEMPERATURES FAST



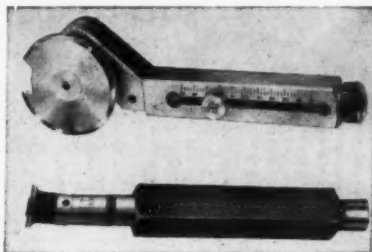
ACCURATELY with PYRO OPTICAL PYROMETERS

Send for catalog No. 85
PYROMETER INSTRUMENT CO. INC.
 Bergenfield 42, New Jersey

For more data circle 489 on Postpaid Card

August, 1960

THREAD CUTTING TOOL



Provided with a scale for angular setting.

Circular Cutter, in high speed or carbide, has a negative profile and machines both thread flanks simultaneously. Thread cutting discs for all threads are available for both external and internal tool holders.

ACME TOOL CORP.

71 West Broadway, New York 7, N. Y.

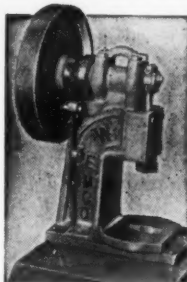
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EMCO

Power Punch Presses

Emco W—
5 Tons

Emco X—
10 Tons



For punching, forming, stenciling and riveting metal, rubber, leather, plastics. Up to 18000 operations per hour. Big-machine speed, strength, rigidity, accuracy, endurance. Compact, simple in design, fool-proof; quality construction. Thousands of Emco "W" and "X" presses illustrate KLaas reliability since 1921. Ask for Bulletin "M-8".

The KLAAS MACHINE & MFG. Co.

5403 Schaaf Road

Cleveland 31, Ohio

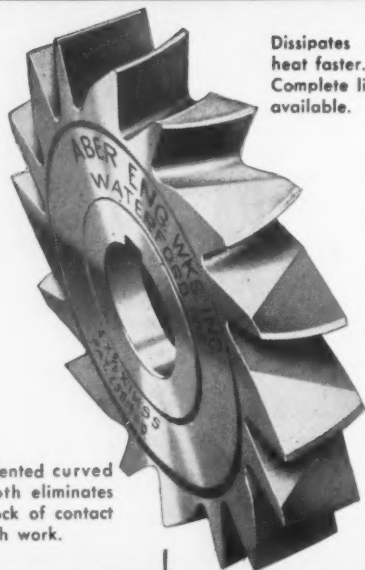
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MODERN MACHINE SHOP 219

Shearing Action

LONGER RUNS *with*

ABER *Curved tooth*
CUTTERS



Dissipates
heat faster.
Complete line
available.

Patented curved
tooth eliminates
shock of contact
with work.

ABER Curved Tooth PLUS FEATURES

- Give More Accurate Control of Limits and Finish
- Elimination of Chatter and Breakage
- Extended Cutter Life

- Better Performance
- Increased Production

FREE DATA —
24 page catalog
on milling with
ABER Cutters.



ABER **ENGINEERING
WORKS**

WATERFORD, WISCONSIN

For more data circle 492 on Postpaid Card

220 MODERN MACHINE SHOP

new equipment . . .

are plus or minus 0.015 on cutter diameter and width.

This cutter is available in three sizes from 4 to 6 inches in diameter and either left or right hand. The 4 inch tools have 10 teeth.

B & S has added a double end, four flute Thriftmill to its line.

The Thriftmill is ground from solid metallurgically tested high speed steel. Its lower initial cost is the result of B & S research and progressive engineering. These Thriftmills are produced by automation. It is said that they produce faster, more efficiently and cost up to 20 percent less. It is recommended as a general purpose tool for economically milling of over 80 percent of end milling operations. It is available in six sizes: $\frac{1}{8}$, $\frac{3}{16}$, $\frac{1}{4}$, $\frac{5}{16}$, $\frac{3}{8}$ and $\frac{1}{2}$ inch.

For more data circle 135 on Postpaid Card

★ modern machine shop ★

ALUMINUM STEP BLOCK AND CLAMP SETS

Northwestern Tools, Inc., 119 Holler Ave., Dayton 3, Ohio, announces that step block and clamps sets are available with aluminum step blocks and heat treated steel clamps.

Sets are available for $\frac{3}{8}$, $\frac{1}{2}$ and $\frac{5}{8}$ inch bolt sizes with standard aluminum blocks 1 inch wide. Sets are also

IMMEDIATE DELIVERY!

KNOBS LEVERS WHEELS & HANDLES



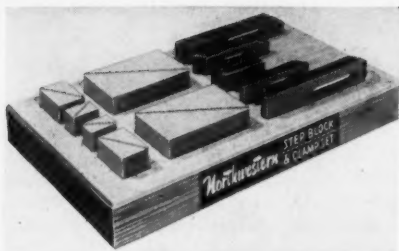
Cadmium plated, large selection of styles and sizes. Specials on request. Send for FREE catalog.

MACHINE PRODUCTS Corporation

6721 E. MICHIGAN ROAD - DETROIT 12 MICHIGAN

For more data circle 493 on Postpaid Card

August, 1960



Aluminum Step Block and Clamp Set.

available for $\frac{1}{2}$, $\frac{5}{8}$ and $\frac{3}{4}$ inch bolt sizes with heavy duty aluminum blocks $1\frac{1}{2}$ inches wide. The sets for $\frac{7}{8}$ and 1 inch bolts are furnished with double duty aluminum blocks 2 inches wide. All sets are furnished in a handy holder.

The aluminum step blocks have a minimum tensile strength of 45,000 p.s.i. They are light in weight, non-magnetic and cannot mar or scratch machine tool tables. Complete sets reduce setup time and eliminate make-shift clamping, which is expensive and dangerous.

For more data circle 136 on Postpaid Card

★ modern machine shop ★

NEW SIZES IN STEEL BARS

Many new parts applications will be opening up for users of Stressproof steel bars, according to La Salle Steel Co., 1474 150th St., Hammond, Ind. The reason is the company's introduc-



DRILL THESE HOLES

BY A QUICK, EASY, INEXPENSIVE METHOD

Your business letterhead will bring literature.

WATTS BROS. TOOL WORKS
Wilmerding, Pa.

For more data circle 494 on Postpaid Card

August, 1960

Z-I-P!
IT'S OPEN IN A JIFFY!



JIFFY PADDED SHIPPING BAGS

*Completely
Redesigned!*

★ Tear Tape Opener —

★ Golden Clupak *
Outer Liner —

★ New Bag Construction

★ NO PRICE INCREASE!



Write for your free sample today!

JIFFY MANUFACTURING COMPANY

360 FLORENCE AVENUE, HILLSIDE, N. J.

Jiffy

*Clupak, Inc.'s trademark for stretchable paper

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MODERN MACHINE SHOP 221

New! \$15*
ONLY . . .

**BUYS THIS COMPACT
MIST COOLANT UNIT**

TRICO

**TYPE
"J"**



***Complete With
Magnetic Nozzle
Holder As Shown**

(In U.S.A.)

Especially designed for small precision machinery used for drilling, tapping, sawing, grinding, etc. Up to 500% savings through increased cutting speeds and tool life. Check these quality features and write for complete details.

- —compact . . . measures 3" x 5"
- —separate air and coolant controls
- —convenient mounting stud
- —attaches to existing shop airline
- —shatter-proof 8 oz. reservoir
- —neoprene flexible coolant line
- —magnetic nozzle holder positions anywhere
- —controlled discharge

Larger Types and Capacities Available.

SEND FOR BULLETIN 37

TRICO FUSE MFG. CO.
MILWAUKEE, WIS. U.S.A.

For more data circle 496 on Postpaid Card

new equipment . . .

tion of new Stressproof sizes in diameters up to 4 inches round.

The new extended size range should be particularly good news to engineers and production men who specify Stressproof wherever its unique properties can be used to advantage. The larger diameters come as a result of popular demand by current users interested in expanding applications.

Extremely important to the nation's industry is the fact that the same high physical properties are held in the larger sizes. High strength without heat treating—100,000 p.s.i. yield—is maintained.

Warpage is held to a minimum, reducing or eliminating entirely the need for expensive straightening operations. Wearability, another of Stressproof's strong points, is said to be better than many heat treated carbon and alloy steels.

Used in myriad parts applications, Stressproof is an ideal material for those looking for ways to simplify the production of parts now being heat treated.

For more data circle 137 on Postpaid Card

★ modern machine shop ★

**SERIES OF
MAGNETIC WORK STOPS**

Announcement is made by Punch Products Corp., 382 Babcock St., Buffalo 6, N. Y., of a new series of magnetic work stops.

These Unipunch Work Stops are said to insure accurate gaging of all workpieces by eliminating "bounce back" as the workpiece hits the gage and eliminates the necessity for the operator to hold the part against the stops during hole punching and notching operations.

The magnetic attraction holds the workpiece snug against the stop.



Workpiece nested in Unipunch Hole Punching setup with three magnetic work stops.

Permanent magnetized blocks are an integral part of these complete stops.

Unipunch Magnetic Work Stops are designed for universal mounting on templates, tee-slotted plates and press brake bed rails, in combination with either Series "A" or "B" Unipunch Hole Punching and Notching Units.

Unipunch self-contained Series "A" Hole Punching and Notching Units

have standard $8\frac{3}{8}$ inch shut height and $3\frac{1}{2}$ inch die height for punching and notching up to $\frac{1}{4}$ inch thick material. Series "B" Units also have standard shut height of $5\frac{1}{2}$ inches and die height of 2 19/32 inches. Unipunch Magnetic Work Stops are available to accommodate both "A" and "B" Series die heights.

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CAM MILLING JIG BORING



A SPECIALIZED CAM
MILLING SERVICE.
JIG BORING
... SPOT WELDING
... CONTRACT PRODUCTION
... EXPERIMENTAL DEVELOPMENT

CAM CALCULATING SERVICE

EISLER ENGINEERING CO., INC.
734 S. 13TH ST., NEWARK 3, N. J.

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GRIND: RADIUS—ANGLES on your SURFACE GRINDER

MOST ACCURATE LOW COST DRESSERS MADE.

ONLY DRESSERS WITH ALL WORKING & BANKING SURFACES

GROUND SQUARE & TRUE.

ADAPTERS TO FIT YOUR CYLINDRICAL GRINDERS

RADIUS DRESSER \$44.

Diamond \$8.



Chatter Resistant, Spring Loaded Spindle

Hardened shaft—bearing adjustable for wear.

Diamond always perfectly centered.

Easily set adjustable 180° stops.

All surfaces ground true from hole.

CAPACITY— $1\frac{1}{2}$ " convex to 4" concave.

10" Wheel size for DeALL and NORTON

Grinders—\$49. Diamond \$8.

14", 20", 24", in stock, low price.

ORDER DIRECT

on our 10 day
money back
guarantee

**ANGLE DRESSER &
PRECISION ANGLE PLATE**

\$49. DIAMOND \$8.



**Removable Angle Plate, precision
ground on all six sides.**

Chatter resistant, dust sealed, hardened
slide. All surfaces precision ground or
honed. Ball thrust bearing. Set easily
and accurately.

The "Mighty Midget" Line

SPERMAN METAL SPECIALTIES • 2199A E. 21st ST. • BROOKLYN 29, N. Y.

For more data circle 498 on Postpaid Card

new equipment . . .

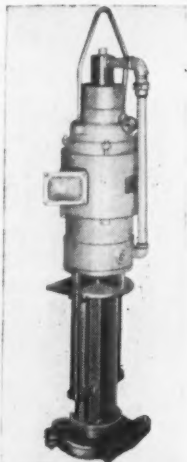
MOLTEN METAL PUMP

The Ruthman Machinery Co., 1817 Reading Rd., Cincinnati 2, Ohio, announces the Gusher Model 150 XE Motor Driven Pump, which has a fully cooled shaft and bearings, providing safety in handling liquids and molten metal up to 1,300 degrees F. This pump can be cooled either by circulating a small stream of water

through 1/4 inch fittings provided with the unit, or with compressed air as a cooling medium when handling molten lead, stereotype metal and so on, up to 800 degrees F. The standard unit is furnished complete with necessary fittings and lift loop, as shown, for simple installation and easy removal when desired. It includes a newly designed larger and heavier impeller housing made of ductile iron to accommodate heavier impeller up to 7 inches in diameter, assuring longer

life and higher heads. The housing is arranged for quick assembly and disassembly by four stainless steel bolts through slotted openings. Pump is available with multiple vee pulleys for independent motor drive.

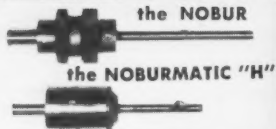
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**Ruthman 150 XE
Gusher Pump.**

Quality
**Deburring & Chamfering
Tools**

**for
FAST
PRODUCTION**



the NOBUR

the NOBURMATIC "H"



for machine
deburring and
chamfering of
line-drilled and
otherwise
inaccessible
hole surfaces.

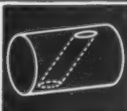
for the automatic
deburring and
chamfering of
front and back
hole faces
simultaneously in
sheet metal, etc.



the NOBURMATIC "G"

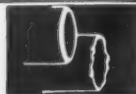


the ELLIPTI-BUR



for deburring
and chamfering
curved or
elliptical hole
surfaces.

for deburring
and chamfering
the ends of rods,
tubes and bosses.



the NOBUROD



the NOBURSINK



for deburring
and chamfering
openly accessible
hole faces.



NOBUR MANUFACTURING CO.

6860 Farndale Ave., No. Hollywood, California

For more data circle 499 on Postpaid Card

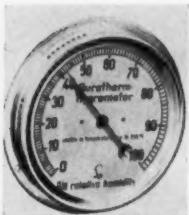
HYGROMETER ACCURATE WITHIN 2 PERCENT IN TEMPERATURES UP TO 230 DEGREES F.

"Durotherm" is a new development in hygrometer elements which comes from West Germany.

It is claimed to be highly accurate, extremely sensitive and it registers within 2 percent, even in temperatures that range as high as 230 degrees F. Regeneration in moist air is no longer required with the "Durotherm" element. The "Durotherm" Hygrometer has a 5 inch silvered metal dial, which is graduated in single percentages in a polished brass flange type case. The overall size is 6 inches.

The "Durotherm" Hygrometer is a product of Edroy Products Company, Department P, 480 Lexington Avenue, New York 17, New York.

For more data circle 140 on Postpaid Card



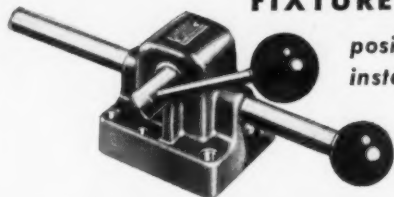
"Durotherm"
Hygrometer

NEW METHOD TO CHECK SCREW THREAD PITCH DIAMETER

All text books and standards publications recommend the fundamentally sound 3-wire method for a true measurement of pitch diameter as a single element.

Scherr-Tumico Co., 200 Lafayette St., New York 12, N. Y., announces that an O-Vee Gage, together with any standard hand micrometer, enables the

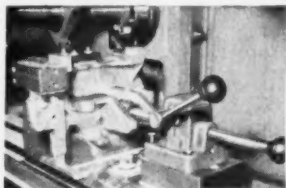
heinrich *Grip-Master* FIXTURE LOCKS



positive clamping
instant setting

SIMPLIFY JIG AND FIXTURE DESIGN

LONG TRAVEL provides plenty of chip clearance, easy loading and unloading. Gets into hard-to-reach places. Base sizes: Model 2FL, $3\frac{3}{8}$ " x $3\frac{1}{4}$ "; Model 9FL, $4\frac{1}{8}$ " x $3\frac{3}{8}$ ". Bar lengths from 8" to 18". Here are two examples of Grip-Masters speeding production in drilling and milling operations.



See Your Industrial Distributor
or Send for Big, Free Catalog
on Heinrich Tools

HEINRICH TOOLS INC., DEPT. 110-H

RACINE, WISCONSIN

For more data circle 500 on Postpaid Card

new equipment . . .

user to determine the actual size of a screw thread and whether it is within tolerance, without any reference to table or calculations.

This new measuring gage consists of a coil, spring mounted on a data plate. Inserting the gage on the thread is done by depressing the lever, thus expanding the coil. Measurements are taken with an ordinary micrometer

over the coils and then checked with limits printed on data plate. No calculations or tables are required. The O-Vee Gages come either in single units or in sets. They are available in standard sizes from No. 5 to 1 inch, all series, all classes of fit. Special sizes are also obtainable in sizes from $\frac{1}{8}$ inch up to and including 5 inches.

The O-Vee Screw Thread Comparator brings the accuracy of the Wire Method of screw thread measurement right down to absolute simplicity,

recording the variation of pitch diameter with rapid precision on the clear, easy-to-read indicator scale, equipped with tolerance pointers. The rugged construction and clean lines make it suitable for use by skilled or unskilled labor, means being provided for sealing all adjustments.

The measuring elements of the instruments are pairs of helical springs of the correct size to suit the thread



NEW PINES HIGH PRODUCTION END FINISHER

for
● TUBE
● ROD
● PIPE

New Model 660 Speeds Chamfering • Deburring • Facing • Drilling • Reaming • Tube-End Forming

- Rugged new design for high production, easy operation, faster feeds on simultaneous inside-outside deburring, chamfering, facing.
- New rigid, unitized spindle frame and heavier base retains close concentricity between the tool holder and chuck jaws.
- Simplified setup, operation, maintenance . . . one-minute speed changes with new hinged safety guard and pivoted motor mount.
- Production to 800 ends an hour . . . capacity to 2" O.D. . . air operation, larger units or special machines are also available.

Write for catalog giving cost cutting features, production data, complete specifications.

PINES ENGINEERING CO., INC.
Specialists in Tube Fabricating Machinery 644 WALNUT • AURORA, ILLINOIS

For more data circle 501 on Postpaid Card



O-Vee Thread Measuring Comparator

being measured. Each pair of springs are housed in a container, clearly marked with the pitch of the screw for which they are intended.

The O-Vee Screw Thread Comparator is available in three models, ranging from $\frac{1}{8}$ to $1\frac{1}{4}$; 1 to $2\frac{1}{4}$ and $\frac{1}{8}$ to $1\frac{1}{4}$ inches with simplified backstop. Standard coils from 8 to 44 t.p.i., as well as left hand and specials to be used with the comparators are available from stock.

For more data circle 141 on Postpaid Card

LINE OF SINGLE-ACTING AIR PRESSES

A completely new line of precision built, single-acting air presses, introduced by Niagara Machine & Tool Works, Buffalo 11, N. Y., is designed for numerous assembly operations and a wide variety of other industrial work.

Twenty-eight models offer a wide selection for punching, swaging, staking, upsetting and imprinting operations, in addition to the seating and



only **S·P·V** **TAPPING** **ATTACHMENTS** have ball type drive!

The axial friction is extremely low, which makes highly accurate thread cutting possible at all times. The throw out clutch eliminates chatter and vibration. Compact design.

SAR 50 SAR 100

Steel SAE 1035	#0-#8	#5- $\frac{3}{8}$ "
Axial float	$\frac{1}{32}$ "	$\frac{1}{16}$ "
Recommended R.P.M.	1400	1000
Length	$5\frac{1}{4}$ "	$7\frac{5}{8}$ "
Max. dia.	$1\frac{3}{4}$ "	$2\frac{3}{4}$ "

Also, non-reversible attachments with capacities from #0 to 2".

Write for illustrated brochure.

A few dealer territories still open.

U.S. DISTRIBUTORS

Homestrand

MACHINE TOOL CORP.

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CENTERLESS GRINDING

Straight cylindrical, shoulder, profile and multiple diameter, internal and surface grinding of any material. Precision ground taper pins and straight dowel pins. Brown & Sharpe and Swiss Automatic aircraft and standard screw machine parts, heat treated and ground, if necessary. Light bench type production drilling. Prompt service. Send prints for estimates.

31 YEARS—SERVING INDUSTRY

PORTER MACHINE CO., INC.

Mfgs. of Por-Matic air operated drilling fixture.

Drill bushings for same in stock.

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For more data circle 503 on Postpaid Card

**CUT
TOOL
COSTS**

**broken tools
made like new again
with NU-TANGS®**

Twisted or broken tangs replaced at low costs on any tool with a Morse Taper (sizes 1 to 6). Hundreds of leading industries save money on drills, reamers, countersinks, cutters, drivers, the NU-TANG way. Prompt delivery. Send for prices—or send tools for repair. All work guaranteed.

NO WELDING!
NO SHORTENING!

NO SLEEVES!
NO DISTORTION!

Send them to us like this! **GUARANTEED STRONG AS NEW!** We return them like this!

Patent No. 2,512,041

NU-TANGS INC.

339 Bates Avenue
Cincinnati 25, Ohio

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6" Universal Dividing Head

with
DIRECT INDEXING

Optional SWIVEL BASE converts a conventional dividing head into a universal work head or rotary table. Change-over is accomplished in seconds without tools or wrenches.

Also available in 10" - 12" sizes and in 10" - 12" spiral drive.

Write for Catalog

CARROLL DIVIDING HEAD CO.
3525 Cardiff Ave. • Cincinnati, Ohio

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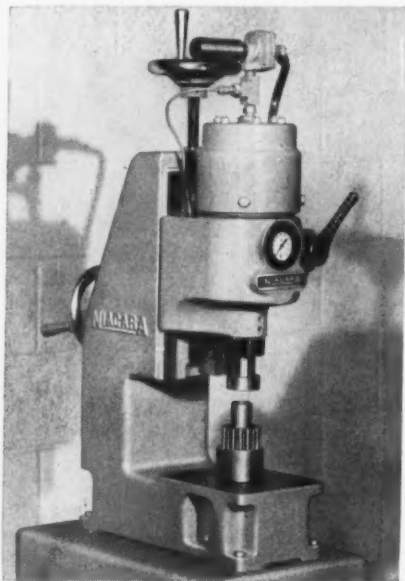
new equipment . . .

removal of close tolerance bearings and bushings.

Featuring four press sizes, ranging from ½ to 2 ton capacities at 85 p.s.i., the line includes a choice of three air and three electrical control systems. For specialized applications, electronic timers, speed control valves and pressure limit controls are available.

Stroke lengths and shut heights are infinitely adjustable within the range of each press size. Rugged cast frames assure minimum deflection under severest loads; utmost accuracy on critical jobs. A diaphragm type, frictionless air cylinder, which requires no lubrication, provides continuous production and maintenance-free service.

Where job requirements demand, the standard, round ram adapter is



The Niagara Single Acting Air Press.

quickly replaced with a special adapter to accommodate a wide assortment of punches and dies. All models may be bench mounted or furnished with a floor stand of rugged, steel plate construction.

For more data circle 142 on Postpaid Card

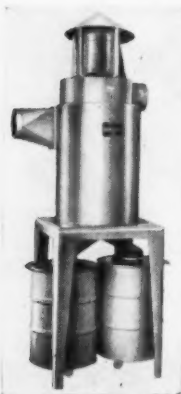
★ modern machine shop ★

DUST COLLECTOR

Hammond Machinery Builders, Inc.,
1615 Douglas Ave., Kalamazoo, Mich.,

continues to expand its line of Cyclone Type DusKolec-tors with the new and larger DK-1055, shown in the accompanying illustration.

Features include a direct driven, self-cleaning fan unit powered by a 7½ h.p., 3,600 r.p.m. motor, which gives a 3,500 c.f.m. rating. Regular inlet size is 10 inches in



Cyclone DusKolec-tor

diameter. Multiple inlets are available to accommodate ductwork to a number of dust sources.

This new model comes equipped with two 55 gallon drums, mounted on casters for easy disposal of dust, chips and dirt. Only the very light dust particles are exhausted outside.

The 55 gallon drum arrangement is also available for the smaller models. For more data circle 143 on Postpaid Card



Blue Devil®
LED-LOK® SAF-LOK®
SOCKET SCREWS

Perfect seal for hydraulic applications, air and any type gas. For minor vibration problems. Standard socket screw sizes.

For severe vibration problems requiring high torque. Special non-ferrous inserts to withstand high temperatures.



So Different-They're Now Patented!

LED-LOK and SAF-LOK Socket Screws have now been officially recognized by the U.S. Patent Office (No. 2,884,038 and 2,923,340.) When you're looking for a screw that's really air-tight or vibration-proof, call for Blue Devil.



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SAFETY SOCKET SCREW COMPANY

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WAREHOUSES AT:

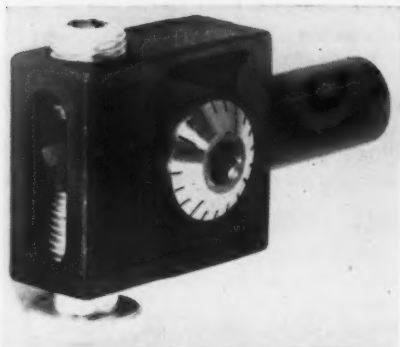
LOS ANGELES • DETROIT • NEW HAVEN • NEW YORK CITY
For more data circle 506 on Postpaid Card

new equipment . . .

TOOLHOLDER

A Microflex Toolholder for positive adjustment of finer finish cuts to fifty millionths inch is announced by Hardinge Brothers, Inc., Elmira, New York.

Designed for use on Hardinge Second Operation Machines and Chucking Machines, it can also be used on jig borers, screw machines and milling machines for holding boring tools. The Hardinge Microflex Toolholder permits instant adjustment by means of a totally new concept. A taper screw acts as a wedge and flexes the body of the toolholder in relation to the shank. The taper screw being always under transverse compression assures a rigid support of the tool and gives a clamping action which holds any setting without any additional



The Hardinge Microflex Toolholder.

locking mechanism. The screw can be turned in either direction and moves the tool accordingly, with no backlash problem. Each of 20 divisions on the dial of the screw indicates a movement of fifty thousandths inch. A clockwise turn advances the tool and a counter-

NOW ALL MILLING MACHINE OPERATIONS ... WITH ONE SET-UP!

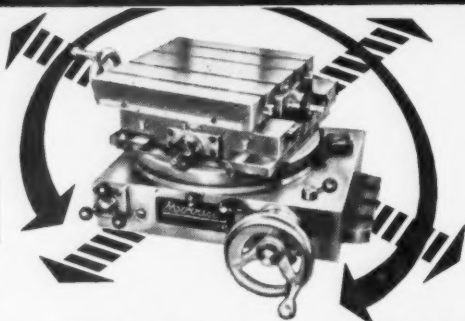
Morrison **CROSS / SLIDE ROTARY TABLE**

**50% to 90% time saved
ON EACH JOB!**

This rugged, precision-built tool permits fast, precise positioning from one set-up. No unclamping or reclamping, simply dial your work-piece to each new position in seconds.



No special training is needed for operation.



No layout is needed on the work-piece.

**Send for descriptive literature
and prices today!**

See us at Booth 402

**PRODUCTION
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MORRISON MACHINERY & ENGINEERING CORP.

935 WEST LAKE STREET, DEPT. MMS, CHICAGO 7, ILLINOIS
For more data circle 507 on Postpaid Card

clockwise turn retracts the tool.

The 00 size Microflex Toolholder is precision-made with a $\frac{5}{8}$ inch hardened and ground shank that accommodates from $\frac{1}{8}$ to $\frac{3}{8}$ inch round shank tools.

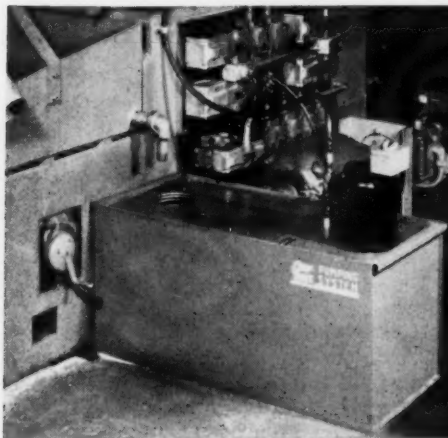
Boring capacity is $1\frac{1}{4}$ inches in diameter.

The Microflex Toolholder is particularly recommended for production tolerances of less than 0.0005 inch. For more data circle 144 on Postpaid Card

CODE MARKING UNIT

A bench model code marking (cold) unit is announced by The Acromark Co., 9 Morrell St., Elizabeth 4, N. J. It consists of a base, a cast U shaped frame with upright to carry pneumatic equipment and includes an interchangeable die holder and fixed holder for the product being marked.

For code marking plastic, wood, metal and fiber parts or products, this



ELIMINATE DOWNTIME*

DUE TO COOLANT PUMP FAILURE

GRAYMILLS SUPERFLO COOLANT PUMPING SYSTEMS

*Installed in a matter of minutes, GRAYMILLS Coolant Pump and Tank Units eliminate production downtime by being ready to go when built-in units fail. GRAYMILLS Pumping Systems are easy to clean, can be used with liquids bearing abrasives and will handle any type coolant or cutting oil. Available with centrifugal or gear type pumps, 1/25 to 1/2 HP, in tank capacities of 2 to 128 gals.

Every plant needs one or more reserve GRAYMILLS Pumping Units as insurance against production downtime. Get yours today! They're sold by leading Industrial Distributors everywhere.

Write for Complete Catalog No. 56R



GRAYMILLS CORPORATION

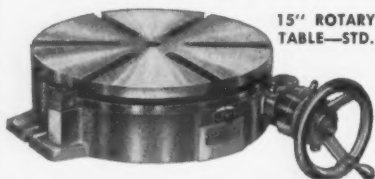
3769 N. LINCOLN AVE. • CHICAGO 13, ILLINOIS

DESIGNED AND PRICED FOR MACHINE BUILDERS USE

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The STEVENS Line SINCE 1925

Introducing NEW series



15" ROTARY
TABLE—STD.

ROTARY TABLES _____ 5-8-12-15-18-24"
sizes both standard and dial indexing types
ADJUSTABLE TILTING TABLES _____ #0-1-2
COMPOUND TABLES _____ #1-1½-2
ROTARY-COMPOUND TABLES _____ #1-1½ 2
INDEX CENTERS—multiple spindle
SPECIAL MACHINES—designed and built

See your dealer or write for bulletins

The John B. Stevens Company

Main Street, Somersville, Conn., U. S. A.

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Hydraulic 12-Ton Press



No. 612 Press

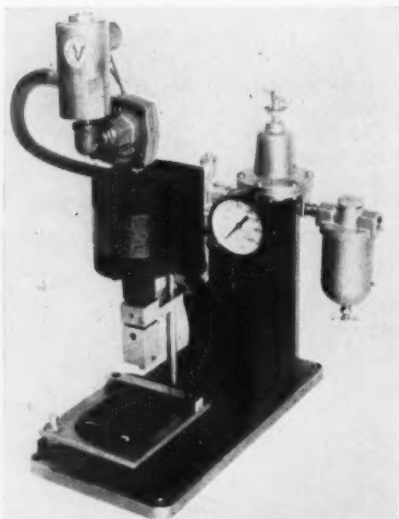
A rugged, precision built hydraulic operated press. Has only one moving part. The guide bracket has bronze bushings fastened to ram to keep ram from turning. Depth of throat 12 inches. With 3 horse motor 15 strokes per minute. Priced to meet any shop budget. Write for catalog.

W. A. Whitney Mfg. Co.

640 Race St. • Rockford, Ill.

For more data circle 510 on Postpaid Card

new equipment . . .



Acromark Bench Model Code Marking Unit.

small unit is both complete and fast. It places letters, numbers, symbols or other code markings on items that require an "unnoticeable" identification marking after manufacture. The item marked in the illustration is an electric razor case.

For more data circle 145 on Postpaid Card

★ modern machine shop ★

FILES INCORPORATE NEW DESIGN THAT INCREASES LIFE AND EFFICIENCY

A new design feature for tungsten carbide rotary files is announced by the Grobet File Co. of America, Inc., Carlstadt, N. J., under the trademark "Facet Tooth."

This new construction is said to increase the efficiency and life-span of tungsten carbide rotary files up to 25 times. It will also greatly increase



Figure 1—Facet Tooth File sizes and shapes.

the range of applications of these tools.

The Facet Tooth Files embody a special, second "trailing" edge built into the length of each tooth, greatly increasing the overall strength of each flute and resulting in faster and smoother stock removal. Chiploading and build-up of edges is said to be greatly reduced.

This design also permits a reduction in the number of flutes, which gives better bite to the tungsten carbide rotary file. The increased strength of each flute allows for complete freedom in the design of the most desirable rake angle to produce a substantial decrease in cratering and in friction heat accumulation.

It is claimed that Facet Tooth Files will have optimal efficiency at high or ultra-high speeds but, because of the special construction of their edges, they can also be used with great productivity at lower speeds. The manufacturer states that the Facet Tooth

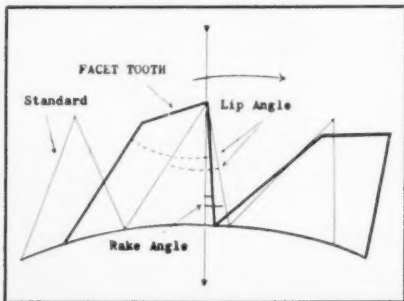


Figure 2 — Schematic of file construction.

August, 1960

RIVETERS . . .

GRANT

PIONEERS
and
PACEMAKERS
in their
line



—head rivets from smallest to 3/4" diameter cold steel, either by NOISELESS SPINNING or VIBRATING HAMMER method — fast, economically — types include Vertical and Horizontal Spindles, foot-power or automatic.

Free estimates of your work.
Write for catalog today.

THE GRANT MFG. & MACHINE CO.
96 Silliman Ave. Bridgeport 5, Conn.

For more data circle 511 on Postpaid Card

PREIS-PANTO SINGLE-LIP ENGRAVING cutters



STRAIGHT AND TAPERED SHANK CUTTERS IN U.S. STEEL TUNGSTEN CARBIDE DIAMOND TIPPED AND DIAMOND DRAG MARKING



CUTTER GRINDER
for sharpening your engraving cutters

are now available in improved design at new low prices

All single lip cutters are furnished unsharpened or sharpened to any shape or angle required

Unsharpened cutters stocked for quick delivery

See Preis first for complete line of quality engraving machines and accessories

TRADE MARK



H. P. PREIS ENGRAVING MACHINE CO.
457 U. S. ROUTE 22, HILLSIDE, NEW JERSEY

For immediate attention write directly to manufacturer below
Ask for nearest representative.

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MODERN MACHINE SHOP 233

A MUST!

for every
MACHINERY USER

2nd INTERNATIONAL **COLISEUM Machinery SHOW**

COLISEUM
1513 SO. WABASH AVE. CHICAGO

**SEPT.
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1960**

**THE
SHOW
TO SEE!**

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**To Effect
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entitling you to register for any or all eight days of
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234 MODERN MACHINE SHOP

new equipment . . .

Tungsten Carbide Rotary Files will, while removing more stock faster, still give a relatively good finish. The construction of the burr will reduce chatter greatly and permit smooth and easy work by the operator.

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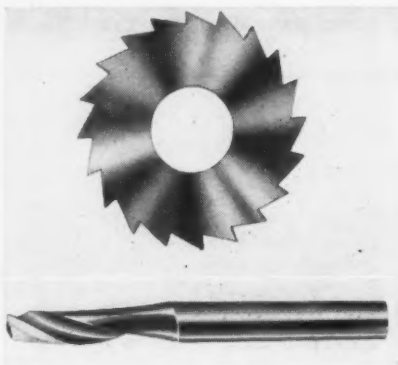
CARBIDE SLITTING SAWS AND ROUTING CUTTERS

Solid carbide slitting saws have been added to the standard line of cutting tools, manufactured by Dixie Tool Industries, Inc., 4555 West Franklin Ave., Bridgeport, Michigan.

These new tools are made with the same super fluting method that has proven successful with Dixie End Mills and various other carbide cutting tools. Keen cutting edges insure longer tool life and faster, smoother cutting operations.

Dixie slitting saws are designed to cut the toughest and most abrasive of modern metals.

The saws are available in the following standard sizes: diameter, $\frac{1}{4}$ to $1\frac{1}{2}$



(Above) Slitting Saw, (Below) Routing Cutter

August, 1960

inches; thickness, 0.010 to 0.060.

Dixie also announces a new solid carbide routing cutter. It is designed to work on the hardest of modern materials and still maintain keen cutting edges. Like all carbide tools, the router can be resharpened at a fraction of its original cost.

This cutting tool, Series 310-A, is available in seven standard sizes; one or two straight flutes, right or left hand spiral.

For more data circle 147 on Postpaid Card

★ modern machine shop ★

DOUBLE END INDUSTRIAL HAMMERS

A new principle in double ended industrial hammers is announced by Dumas Co., Inc., 1 Jackson St., Worcester 8, Massachusetts.

It has no threads, like other changeable headed hammers. The heads are held tighter with use. A tapered shaft in a tapered hole is the method of holding the heads. A knock-out pin is used for removing the heads. Because of this holding method, both brass and various forms of plastic heads can be used.

Other features are: a compact steel body, instead of cast zinc; a tapered pin is used to hold the head of the handle for safety.

Sizes include 14 ounce, 1 inch diameter and 20 ounce, 1¼ inch diameter. Nylon, plastic or brass heads are available.

For more data circle 148 on Postpaid Card



Evertight Replaceable Head Hammer

August, 1960

LOW COST WAY TO CUT GRINDING COSTS



When you dress grinding wheels regularly you clean loaded pores, uncover fresh abrasive grains — GET NEW PERFORMANCE AGAIN AND AGAIN. Dressing makes every wheel more efficient. In the complete Desmond line there is a dresser to meet your requirement—at low cost. A typical Desmond-Huntington dresser* costs less than \$3.00; replaceable cutter sets average 36c. Ask your Desmond distributor's advice.

*The only complete line of
grinding wheel dressers and cutters*

Desmond

Desmond-Stephan Mfg. Co.
Urbana, Ohio

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MODERN MACHINE SHOP 235

new equipment . . .

FUNDAMENTAL INSPECTION TOOLS AVAILABLE IN LIGHTWEIGHT CARRYING CASE

Bausch & Lomb, Inc., 893 St. Paul St., Rochester 2, N. Y., announces a complete set of industrial optical tools. The kit brings together components of fundamental measuring and examina-

tion tools and offers them in a single package. The kit has particular value for quality control and inspection work, since the flexibility provided by its many component parts is a quick and convenient way to meet changing job requirements. Within the single, compactly designed kit are more than 20 optical units which can be assembled into a variety of optical viewers, surface comparators and microscopes. The sturdy case with full compliment

of parts, weighs only 16 $\frac{3}{4}$ pounds, making it easily portable within a department or between inspection areas. Its unified design provides an excellent central "stockroom" of optical tools from which to supply the individual needs of several inspection departments at the same time.

Magnifications vary from 7x, with the small optical viewer, to combinations of 10, 20, 40 and 80x, with the various microscopes. Also included is a selection of reticles and measuring



HAND WHEELS • MACHINE HANDLES



HAND WHEELS

Best quality, fine grain cast iron. Rim and handles polished to high luster. Handles are revolving, solid or omitted. Available in standard sizes 4" to 12" dia. with plating, broaching or other machining to your specification.



DISHED



STRAIGHT



MACHINE HANDLES

Revolving handles turn on HARDENED steel spindle with permanent graphite grease lubrication permitting FASTER, EASIER adjustment by user. Machined from quality BAR STEEL ground and POLISHED to a smooth, high luster.



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Tool
Division

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18 Disney St.
Cincinnati 9, Ohio



Optical Aids Kit

For more data circle 515 on Postpaid Card

scales ranging from divisions of 0.001 to 0.005 inch. The instruments are suitable for mounting on machinery, as well as for bench inspection.

For more data circle 149 on Postpaid Card

★ modern machine shop ★

OPTICAL PROJECTOR ATTACHES TO ANY LATHE

The advantages of optical comparison for magnification and direct viewing of work in process are available

to users of lathes, through the Model 7M Optical Projector, which is available from Stocker and Yale, Inc., 50 Green Street, Marblehead, Massachusetts.

The Model 7M readily attaches to any lathe and allows continuous and precise magnification for checking, direct measurement and comparison of work in process to transparent overlay charts. The operator sees the work in magnified form on the screen at the same time the work is being

Johnson on the job

at JACOBSON
NUT MFG. CORP.



From an interview at
Jacobson Nut Mfg. Corp.
Kenilworth, New Jersey:

"Lower maintenance and less down-time, due to breakdowns, prompted the Company to settle on Johnson Presses for future standardization."



50 models of Johnson Presses

INCLINABLE • STRAIGHT SIDE • GAP • HORN



Special presses built to order.

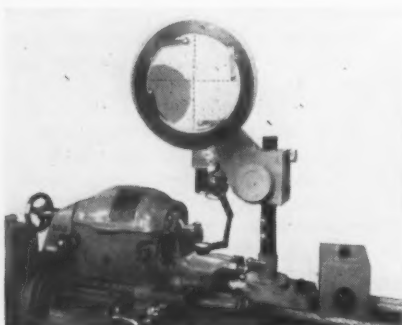
Complete specifications on all models in our FREE Catalog No. 59. Write today.

JOHNSON MACHINE & PRESS CORP., 620 W. Indiana Ave., Elkhart, Ind.

Booth 352 • Machine Tool Exposition • Chicago • Sept. 6 to 16

For more data circle 516 on Postpaid Card

new equipment . . .



Model 7M Optical Projector for lathes.

done, not afterwards when it might be too late. With dimensions magnified, close tolerance work is tremendously simplified and, with the layout on the screen of the projector, the operator can work to a line or specific dimension instead of a tolerance.

A superior optical system gives a clear, sharp, high contrast image. The image is accurate, easy-to-see and easy to work with. No shields or special lighting conditions are necessary. A selection of magnifications from 10 to 100x are standard and interchangeable. For more data circle 150 on Postpaid Card

★ modern machine shop ★

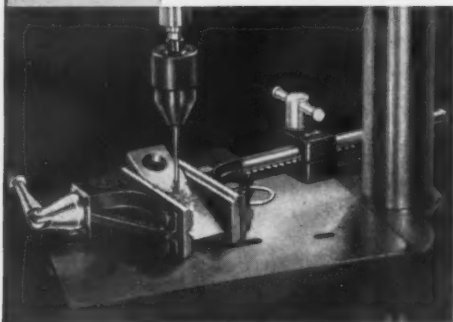
**NEW ROD SEAL DESIGN
FOR AIR CYLINDERS**

Flick-Reedy Corp., Miller Fluid Power Div., 7N023 York Rd., Bensenville, Ill., offers its air cylinders with its new "Sta-Dyn" Piston Rod Flange Seal, designed to simplify and speed up cylinder assembly and rod seal field replacement.

The "Sta-Dyn" seal combines the rod flange seal with the rod bushing sealing ring into a single, simple, one piece unit, thus completely eliminating one assembly operation. In this way, the self-regulating, wear-compensating

Speed production . . . cut costs with

INSTANT CHANGE



AUTOMATIC KEYLESS CHUCK

Lets you change tools in seconds without stopping the spindle. One chuck does the work of several spindles, won't chew up tool shanks. The greater the torque, the tighter the grip.

DRILL PRESS VISE

Floats and locks instantly, positively, in any position on table. Holds work safely for accurate drilling and tapping. Two models: 9" and 12" capacities.

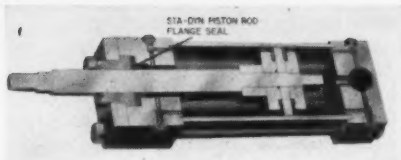
Write for illustrated folder and name of nearest distributor to AMF Tool Division, American Machine & Foundry Company, 224 Glenwood Ave., Bloomfield, N. J.



WAHLSTROM®
AUTOMATIC CHUCKS

FLOAT-LOCK®
SAFETY VISES

For more data circle 517 on Postpaid Card



New Rod Seal Design for Air Cylinders.

features of the dynamic flange rod seal are combined with the static rod bushing seal—forming a single static-dynamic seal that “seals with pressure” (as specified by J.I.C. standards). A pressure balancing ring, installed at the base of the “Sta-Dyn” seal, protects it against the “blow out” action of trapped pressure.

This seal design is supplied as standard construction on Miller Air Cylinders. For more data circle 151 on Postpaid Card

★ m m s ★

SOLID CARBIDE MINIATURE SLAB MILL

Development of a solid carbide miniature slab mill, capable of

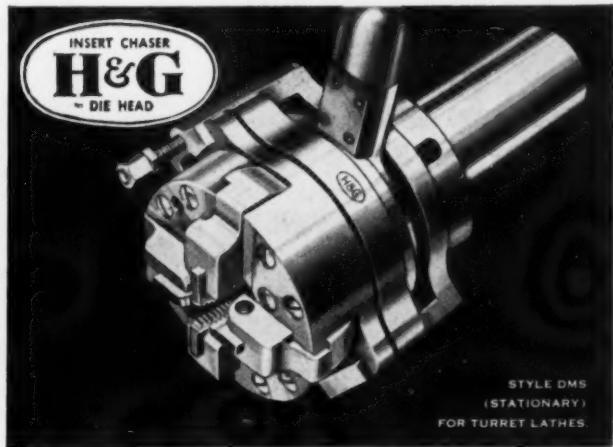


Miniature Slab Mill

August, 1960

machining the new super alloys, ultra strength steels, refractory metals and nuclear reactor metals, is announced by M. A. Ford Mfg. Co., 1545 Rockingham Rd., Davenport, Iowa. This miniature slab mill offers the advantages of solid carbide construction with controlled flute geometry.

The Ford Solid Carbide Miniature Slab Mill is manufactured in a wide variety of sizes, ranging from 1 inch in diameter by 1 inch in length up to 2 inches in diameter by 3 inches long.



STYLE AND SIZES FOR ALL MACHINES ON WHICH THREADS ARE CUT

This die head is unique

THERE IS NO OTHER LIKE IT

It cuts threads with insert chasers. These are, in reality, small sections of the business end of large and expensive chasers, but with this important difference: *their cost is so low they can be even thrown away when dull.* For example, for approximately \$50 you can get a dozen sets of insert chasers, each set ground ready to go. Change now to insert chaser die heads and watch your performance improve. “UNIFIED AND AMERICAN SCREW THREAD DIGEST” sent free on request.

**THE EASTERN MACHINE SCREW CORP.
40-50 Barclay St., New Haven, Conn.**

For more data circle 518 on Postpaid Card

MODERN MACHINE SHOP 239



PORTABLE HONES

SAVE MANY HOURS IN PRODUCTION,
SALVAGE, JOB LOT, MAINTENANCE
AND TOOL ROOM

More than 100,000 satisfied users testify to the utility of these "Tools of a Thousand Uses" for internal diameter work in nearly all materials.

Sunnen Portable Hones are guaranteed to produce geometrically round, straight bores—accurate within .0005"—with any desired cross-hatched, lubricant-retaining finish.

Corrects Errors	Fastest Stock Removal
Exact Size Control	Positive Adjustment
Controlled Finish	Portable, Yet Rugged
Operates in any Position	

Your Sunnen Field Engineer will be glad to help you solve your sizing problems at no obligation to you.

SN-75 Midget Hone	Range 1 3/4" to 2"
JN-95 Junior Hone	Range 2" to 2 3/4"
AN-112 Standard Hone	Range 2 1/2" to 7"
AN-812 Heavy Duty Hone	Range 4 3/4" to 20 1/2"

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Canadian Factory: Chatham, Ontario

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240 MODERN MACHINE SHOP

new equipment . . .

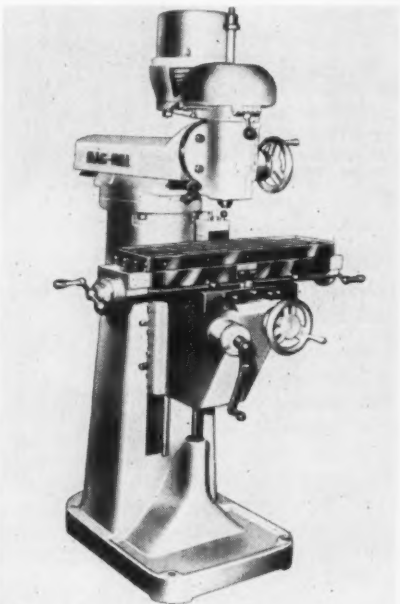
Fluting coarseness is optional and flute geometry is available as required. This tool is manufactured with a brazed split steel sleeve driver.

For more data circle 152 on Postpaid Card

★ modern machine shop ★

MILLING MACHINE FEATURES MAGNETIC TABLE

The need for time consuming bolting and clamping to hold the workpiece is eliminated by the built-in magnetic table of the new Mag-Mill Vertical Milling Machine, announced by Hanchett Magna-Lock Corp., Dept. MS7, Big Rapids, Mich. The table is electro-magnetic and is controlled with a d.c. rectifier with a built-in manual revers-



Mag-Mill Vertical Milling Machine.

August, 1960

ing switch which demagnetizes the table, workpiece and accumulated chips, making it easy to remove the work and keep the table clean. Automatic demagnetizing is also available.

The table has a 7 by 27 inch working surface and has three tee slots 11/16 inch wide and 2 1/8 inches apart. Longitudinal table travel is 16 inches, cross travel 8 inches, vertical knee travel 15 inches, vertical quill travel 4 inches.

Spindle construction assures maximum rigidity. The one piece head casting is supported by a 7 1/2 inch diameter head flange, which provides full bearing support for the alloy steel hard chrome plated quill. The spindle revolves on two Timken and three ball bearings.

Distance from spindle nose to top of table is 16 5/16 inches. With compound head swivel, available as optional equipment, the distance is 16 9/16 inches.

For more data circle 153 on Postpaid Card



Two Cobalt Super High Speed Drills.

COBALT SUPER HIGH SPEED DRILLS

The Union Twist Drill Co., Athol, Mass., announces the stocking of a complete line of cobalt super high speed drills in both wire and jobber lengths and in taper shanks.

These drills are made of premium T-15 Steel and are especially abrasion resistant. They are recommended for the drilling of the newer and harder missile metals.

For more data circle 154 on Postpaid Card

★ modern machine shop ★

BENDER FOR LARGE TUBING

Pines Eng. Co., Inc., 643 Walnut, Aurora, Ill., has extended its line of

free!

NEW 1960
CATALOG

MONTGOMERY TOOLS

128
TIME SAVERS
FOR TOOL MAKERS

MONTGOMERY & CO., INC.
411 Morris Avenue
Springfield, N.J. DRexel 6-4767

Drill Press Tooling

Adjustable short-run drill jig
Self-centering air vise
Combination tapping/deburring tool

Lathe Tooling

Ball-turning tool for concave and convex radii
Quick-change tool holders for turret work on standard lathes

Surface Grinder Tooling

Jaws for holding non-magnetic material on magnetic chucks

Milling Machine Tooling

Vise with automatically contouring jaws for any odd shape work

Inspection Tools

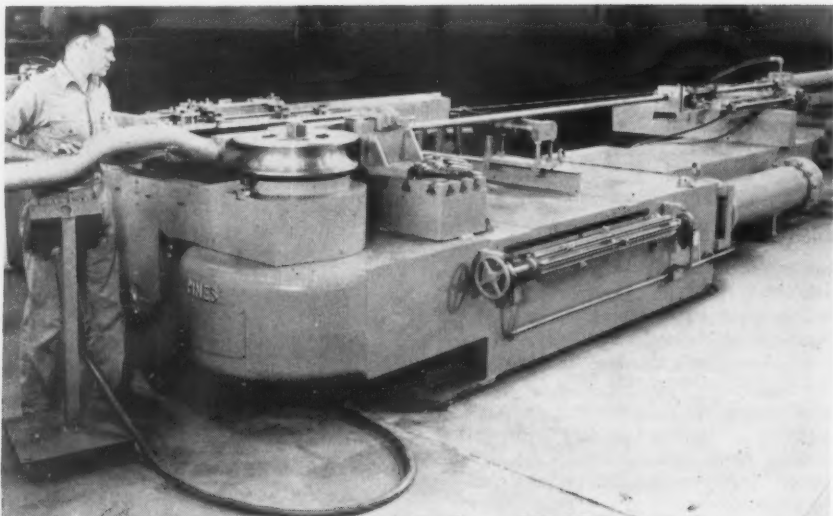
Thread Triangles for simplified measuring of pitch diameter

Plus many more cost-cutting tools for toolroom, and production line

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your free copy.

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new equipment . . .



Model 4-8 Bending Machine bending thin wall stainless steel missile ducting.

standard rotary bending machines with a new model, designed to meet the heavy bending requirements of the automotive, boiler, farm equipment, aircraft and other industries that form large pipe, tube, channel, angle and solid bar. The machine is built in two versions. When set up for bending heavy materials, the machine is called the Model 6 and will handle produc-

tion bending of extra heavy steel pipe up to 6 inches, channel to 9 inches by 15 pounds, square steel bar to 4 1/4 inches, round solid steel bar to 5 inches in diameter and steel angles to 8 by 8 by 3/4 inch. When the machine is adapted for handling thin wall tubing as used in the aircraft industry, the machine is known as the Model A-8 and is capable of bending tubes



MEASURING TOOLS ACCURATELY REPAIRED

Our complete stock of factory parts allows us to conveniently service you without delay. One shipment—to one place, saves time, eliminates extra paper work, saves on cost . . . and gives you faster service.

- Ames
- Brown & Sharpe
- Federal
- Gem
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COMPLETE STOCK OF FACTORY PARTS

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- Micromaster
- Zeiss
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- Slacomb
- Standard
- Starrett
- Mahr and others

Send shipments to:

PRECISION TOOL REPAIR CO.

923 EAST EIGHT MILE ROAD

• FERNDALE 20, MICHIGAN

• Lincoln 7-8434

For more data circle 521 on Postpaid Card

up to 8 inches o.d. with wall thicknesses up to 0.250 inch wall steel tube.

Both versions of the machine feature smooth hydraulic operation, economy and versatility of tooling, fast changeover in setup, convenient work height and dependable bend accuracy within plus or minus $\frac{1}{2}$ degree. Both are self-contained and occupy a space of approximately 14 by 32 feet, including arm swing. A 20 h.p. motor provides power to the hydraulic system. Angles up to 180 degrees, plus sufficient over-bend to compensate for springback, are formed in a single cycle. Both machines handle bends up to a 42 inch maximum centerline radius.

For more data circle 155 on Postpaid Card

★ modern machine shop ★

SOFT BLANK TOP JAWS

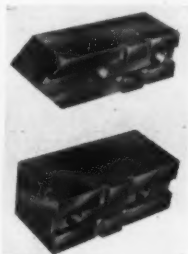
A complete line of soft blank top jaws in sizes and shapes for all chucks

made to American Standards is announced by The Skinner Chuck Co., Department 2J6, New Britain, Connecticut.

Included in the line are medium and heavy duty types in standard, extra high and long pointed jaw construction for tongue and groove mounting. In the medium duty line, top jaws for chucks 18 inches and larger are interchangeable with the heavy duty type.

Skinner also offers soft blank top jaws and master keys for mounting on serrated master jaws, for heavy duty power and scroll chucks.

The top jaws can be used as supplied or shaped to meet specific require-



Soft Blank Top Jaws

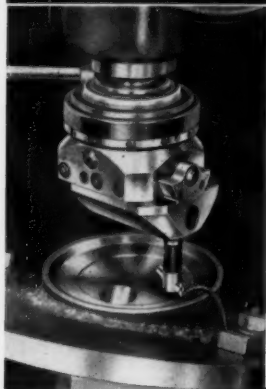
MASTER WORKMANSHIP REQUIRES



MASTERHEADS

"THE
PRECISION
HEAD"

BORING - TURNING - RECESSING - UNDERCUTTING - TAPER CUTTING



WOHLHAUPTER UNIVERSAL FACING AND BORING HEADS FEATURE:

- Automatic Feeds and End Release
- 9 Sizes to 36 $\frac{1}{4}$ "
- 12 Feeds in 0.0008" Increments

Increase the capacity of any machine without facing facilities.

→ WRITE FOR COMPLETE CATALOG

Exclusive
Distributor

KARL A. NEISE, Inc.
Dept. MM, 404 4th Ave., New York 16, N.Y.

ONE OF MANY
NEISE
MODERN TOOLS

For more data circle 522 on Postpaid Card

new equipment...

ments. They are manufactured from low carbon steel, which can be easily carburized and hardened.

All soft blank top jaws are furnished in black and are processed to resist rust. Hardening instructions are included with the jaws.

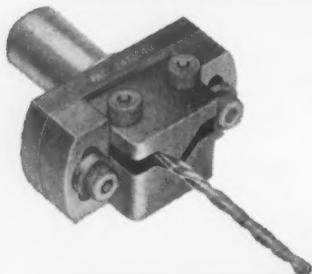
For more data circle 156 on Postpaid Card

FLOATING ACTION TAPPING ATTACHMENT

Tapmatic Corp., 845 West 16th St., Costa Mesa, Calif., announces the Tapmatic "700A" Tapping Attachment. This model features in its design a free axial floating drive spindle, which permits taps to determine their own lead for advancing and retracting during the tapping cycle. No human or mechanical lead pressure is required. The "lead error" often obtained with conventional friction drive attachments is, therefore, eliminated.

Torque adjustments are quickly and easily made by simply turning the knurled cap at the top of the unit to the desired setting. Correct graduations for each size tap are clearly visible. A spring loaded ball clutch stops the rotation of the drive spindle

ACCURATE SET-UPS FAST!



Accurate, rapid set-ups the first time, every time... is the reason Brookfield Tool Holders are now widely used in practically every metalworking plant in the country. With one Brookfield Tool Holder, you can cut your stock of bushings by at least 100. Here's why:

BROOKFIELD TOOL HOLDERS

➤ **ADJUSTABLE V JAW** holds wide range of tool diameters without bushings or accessories.

➤ **AXIALLY TRUE DESIGN** makes perfect tool alignment almost automatic.

➤ **BALANCED-PRESSURE LOCKING ASSEMBLY** maintains uniform seating, eliminates creep or shift.

➤ **EASY TO USE** — just slip tool in the jaw, tighten, then float tool into dead center and lock.

AVAILABLE IN A WIDE RANGE OF SIZES

MODEL NO.	HOLDING RANGE	SHANK DIA.
EA-10	$\frac{1}{8}$ "— $\frac{3}{16}$ "	$\frac{3}{8}$ "
DA-10	$\frac{1}{8}$ "— $\frac{1}{2}$ "	$\frac{3}{8}$ "
DA-12	$\frac{1}{8}$ "— $\frac{1}{2}$ "	$\frac{3}{4}$ "
GA-12	$\frac{1}{8}$ "— $\frac{3}{4}$ "	$\frac{3}{4}$ "
GA-16	$\frac{1}{8}$ "— $\frac{3}{4}$ "	1"
KA-16	$\frac{1}{8}$ "—1"	1"
KA-24	$\frac{1}{8}$ "—1"	1 $\frac{1}{2}$ "
PA-24	$\frac{1}{4}$ "—1 $\frac{1}{2}$ "	1 $\frac{1}{2}$ "
PA-28	$\frac{1}{4}$ "—1 $\frac{1}{2}$ "	1 $\frac{3}{4}$ "

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BROOKFIELD, INCORPORATED

STOUGHTON 111, MASSACHUSETTS
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Tapping Attachment

immediately when the tap becomes dull, loaded or bottoms in a blind hole.

Designed to meet the demand for a rugged, heavy duty tapping attachment capable of consistently producing top quality threads, the Tapmatic "700A" has a rated capacity in mild steel from No. 10 to $\frac{5}{8}$ inch-18 taps. For more data circle 157 on Postpaid Card

★ modern machine shop ★

MULTI-PURPOSE LIQUID CLEANER

Kelite Corp., 81 Industrial Rd., Berkeley Heights, N. J., has introduced Kelite Formula 28, which is a multi-purpose liquid cleaner.

Kelite Formula 28 removes grease, oil, ink, soot, dirt, light carbon and similar deposits from hard surfaces without heat, fumes or fire hazard. It is used safely, at room temperature, by spray, wipe-on or immersion method, on commonly used metals,

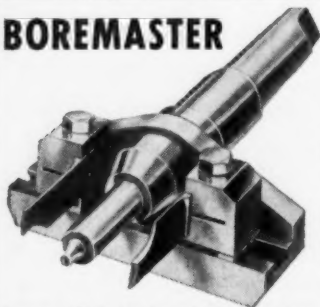


Kelite Formula 28 Liquid Cleaner

plastics, Plexiglass, rubber, porcelain, wood and painted surfaces. As well as being a machinery-equipment cleaner and building maintenance supply, it can be used as a preliminary degreaser prior to alkaline cleaning and before pre-spotweld etch. Kelite Formula 28 is water diluted for most purposes and has excellent storage stability.

For more data circle 158 on Postpaid Card

BOREMASTER



For Holes
and Cores
in One
Operation

Bores 6" hole in $3\frac{1}{4}$ " Machine Steel in 6 minutes.
Bores a 5" hole in Boilerplate in 80 seconds.

- Rigid and Heavy-Duty
- Saves Time
- Saves Material (cores intact)
- With or Without Retractable Pilot
- Excellent Chip Load Distribution
- Easy Cutting
- 5 sizes for $1\frac{1}{2}$ " to $11\frac{1}{4}$ " dia. work to 8" depth



Write for illustrated catalog and learn of the other advantages meaning **HIGHER PROFITS FOR YOU**

Sole U. S.
Representative **KARL A. NEISE, Inc.**
Dept. MM, 404 4th Avenue, New York 16, N. Y.

ACCURATE
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THE
BOREMASTER

NEISE
MODERNTOLS

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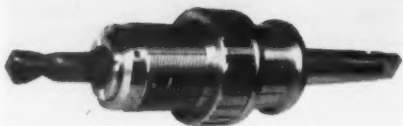
new equipment . . .

PRECISION MICRO DRILL STOPS

Wohnlip Products, Inc., 634 Central Ave., East Orange, N. J., announces the availability of precision micro drill stops, the main function of which is to end guess work and costly rejects by giving precision hole depth control with consistent hole depth accuracy automatically, without the element of human error.

These drill stops can be used for drilling, center drilling, counterboring, countersinking, reaming, end milling, boring, tapping or engraving on drill presses, radial drills, lathes, turret lathes, hand and automatic screw machines or boring machines.

The manufacturer claims that the face of the work, fixture or bushing on which it "stops", while the spindle is rotating, will not be marked, damaged



Wohnlip Precision Micro Drill Stop

or chewed up. The drill stop is quickly attached to drills or other tool shanks while in or out of the machine. Furthermore, it can be instantly adjusted or removed.

Additional features of these drill stops include: instant precision adjustment made without additional tools; may be used in horizontal or vertical positions; may be used for straight and taper shank drills and reamers; clearly marked for easy and accurate readings; no collets required, resulting in substantial savings.

For more data circle 159 on Postpaid Card

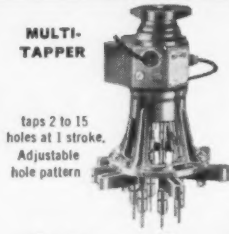
COMMANDER TAPPERS



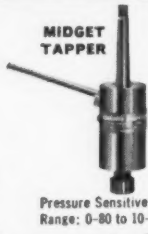
LEAD-MATIC TAPPER
Lead Screw Tapper
Range: 0-80 to 1/4"-16



PNEU-MATIC TAPPER
High Production,
Air Operated
Range: 0-80 to 1/4"-16



MULTI-TAPPER
taps 2 to 15
holes at 1 stroke.
Adjustable
hole pattern



MIDGET TAPPER
Pressure Sensitive Drive
Range: 0-80 to 10-24



STANDARD TAPPER

Adjustable
Torque Control
Range: 0-80 to 1/4"-16

a Type and Size for Every Job!

Commander Tappers are made in 10 models — each designed to handle tapping jobs over a wide range. From the Commander Tapper line, you can select the right unit to give you the exact performance your job requires. Whichever Commander Tapper you select, you will get unequalled performance and tapping economy. Sold and serviced by drilling and tapping specialists. Write for the Commander Production Tool Catalog and name of nearest Distributor.

See us at Booth 321, Production Engineering Show, Chicago, Navy Pier

Commander MFG. CO.

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CHICAGO 24, ILLINOIS

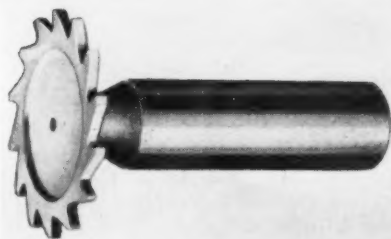


NARROW WIDTH WOODRUFF SLOTTING CUTTERS

Narrow width Woodruff style slotting cutters, in a wide range of sizes, are now available from stock for immediate shipment, according to Quality Tool Works, 322 South Elmwood Ave., Waukegan, Illinois.

Recommended for narrow slotting or slitting operations, where a shank type cutter is preferable to an arbor type saw, the narrow width Woodruff style slotting cutters can be set up faster and are ideal for cutting slots, grooves, recesses and so on into inside diameters, cavities, pockets or recessed areas, where slotting saws cannot be used because of arbor interference.

Quality's shank type narrow width Woodruff style slotting cutters are available from 1/2 to 1 1/2 inch diameters and widths from 0.020 to 7/32 inch, have 1/2 inch shanks, 2 inches under the head. Cutters are hollow ground



Narrow Width Woodruff Style Slotting Cutter.

to give free cutting action. Standard tolerance on width is plus or minus 0.001. Right hand cut is standard. For more data circle 160 on Postpaid Card

★ modern machine shop ★

ALL GEARED HEADSTOCK LATHE FEATURES 12 SPINDLE SPEEDS

C&J Master Model Lathes, manufactured by the Carroll-Jamieson



TYPE HOLDERS

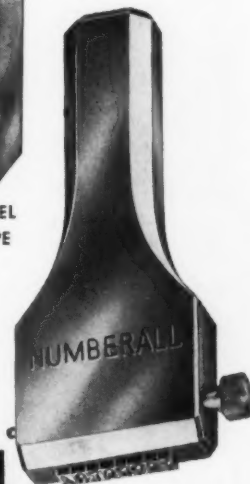
to stamp metal products

Hand or Press Style. Type can be easily, quickly loaded and unloaded. Simplest construction . . . just a sturdy pin holds the type securely. No screws nor springs. Super-quality steel type made in various sizes: 1/32" up to 1/2" figures and letters. Write for Bulletin MS-23H.

STEEL TYPE AND BOX Indexed Sectional Type Box with separate compartment for each character. Two sizes for small and large type. We can also make steel type with round face characters.



STEEL
TYPE



NUMBERALL STAMP & TOOL CO.
HUGUENOT PARK STATEN ISLAND 12, N. Y.

For more data circle 526 on Postpaid Card

new equipment . . .

Machine Tool Co., Dept. 9, Batavia, Ohio, have all geared headstocks and many other high quality features. These features, plus the low cost, make the C&J the ideal lathe for general service including tool and die work and a multitude of modern machine shop applications.

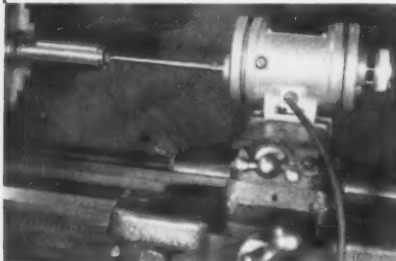
C&J Lathes are extremely rugged.



PRECISION TOOL POST GRINDERS

Featuring the circumferentially adjustable spindle assembly—

Mount on any machine tool—In any position—For the precise finishing of any material including ceramics—



— For Internal Grinding —
Interchangeable Extension Spindles
2", 3", 4", 5" & 6" lengths always in stock.

- 14 Models $\frac{1}{8}$ to 1 H.P.
- Spindle Speeds to 50,000 RPM
- Use Grinding Wheels $\frac{1}{8}$ " to 6"
- Permanent Lubrication

Write for new catalog

THE MCGONEGAL MFG. CO.

135 MOZART STREET

EAST RUTHERFORD, NEW JERSEY

Telephone GENEVA 8-2313

For more data circle 527 on Postpaid Card

248 MODERN MACHINE SHOP



C & J Master Model GH 16 Inch Lathe

The all geared headstock is designed for convenience, power and durability. Twelve spindle speeds, from 20 to 900 r.p.m., are obtained through two speed handles. Gears are heat treated alloy steel and shafts are accurately ground special steel. The taper nose spindle is of the standard LO type. It is mounted in precision taper roller bearings. The headstock is lubricated by a splash system, with all parts running in a constant oil bath. The oil level is checked by a window type oil indicator.

The oil tight cover is easily removed. A new improved friction type clutch and brake instantaneously controls the spindle, allowing the motor to run continuously. The clutch and brake control handles are conveniently placed, and the apron control handle on 10, 12, 14 and 16 foot lathes permits

END MILLS SHARPENED

60¢ per end up to $\frac{1}{2}$ " dia. 20¢ more for each $\frac{1}{8}$ " over $\frac{1}{2}$ " dia. Send us your worn, dull and chipped end-mills and we will sharpen them complete same as a new end mill. Ends plastic dipped.

SUPREME KEYSEAT CUTTERS CO.

1328—43rd St., Kenosha, Wis. OL 4-8800

Mfg. of Woodruff Keyseat Cutters

For more data circle 528 on Postpaid Card

August, 1960

spindle control from the apron at any position along the bed. At 100 r.p.m., the front spindle bearing takes a 6,622 pound radial load, a 5,227 pound thrust load. The rear spindle bearing takes a radial load of 5,681 pounds and a thrust load of 3,776 pounds.

For more data circle 161 on Postpaid Card

★ modern machine shop ★

BROACHING MACHINE

Apex Broach Co., Inc., Machine Div., 6401 East Seven Mile Rd., Detroit 37, Mich., announces a horizontal hydraulic broaching machine. This machine broaches holes of any shape — round, square, hexagonal, spline, oval, as well as keyways and cams. The machine is ideal for surface broaching.

The Apex Broaching Machine is ruggedly built to stand the rigors of continuous production. The extra heavy, one piece, welded all-steel frame provides the rigidity needed for close tolerance work and fine finishes. Built-in overload protection permits stalling under full load without damage.

The large, heavy, cross-keyed faceplate is equipped with an extra large

reducing bushing. The motor and pump are mounted in perfect alignment on the sub-plate inside the dry rear compartment, along with conveniently located valving and limit switches. The wide work area between way caps facilitates special tooling. The machine has a straight in-line pull. Broaches, machine ram and and machine ways are all on the same centerline. The broach pull is not taken on tee slot, but on the heavy cross-rib section behind the tee slot.

LAPPING--

polishing, deburring, and many other secondary finishing jobs on metal and plastic parts are handled faster, better, cheaper on SCHAUER SPEED LATHES.

Holding fixtures to suit the work.

A wide variety of speed ranges on single speed, two speed and variable speed models. Write for Catalog 580.



SCHAUER
MANUFACTURING CORP.

SEE SCHAUER SPEED LATHES, BOOTH 322,
PRODUCTION ENGINEERING SHOW

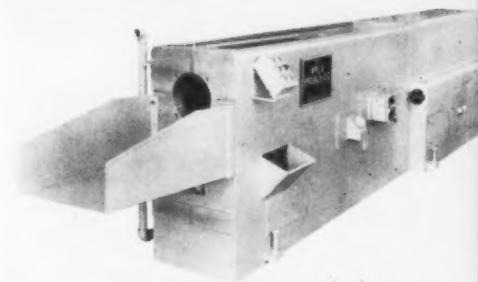
4501 ALPINE AVE., CINCINNATI 42, OHIO

For more data circle 529 on Postpaid Card

new equipment . . .

The tee slot is used only as a vertical adjustment guide. A calibrated scale, next to the puller adapter, makes vertical centering adjustment of broach pullers much more precise.

Standard equipment on the Apex Horizontal Hydraulic Broach includes: flexible motor and pipe coupling; adjustable overload relief valve;



High capacity Apex Horizontal Hydraulic Broach of sturdy, precision construction.

CARBIDE THRO-AWAYS — INSERTS — SLUGS, PRECISION GRINDING BUSINESS FOR SALE. NEW PROVEN PRODUCTION METHODS. ALL CATALOG & SPECIAL SIZES. CAMS, FIXTURES AND EQPT. TWO MICRO FINISH AND INDEXABILITY.

ACRO-DEX TOOLS, INC.

3810 W. Alexis Road • Toledo, Ohio

For more data circle 530 on Postpaid Card

directional control valve; limit switches; oil level sight gage; hydraulic pressure gage; one plate type reducing bushing to save the machine face; coolant pump and motor.

For more data circle 162 on Postpaid Card

★ modern machine shop ★

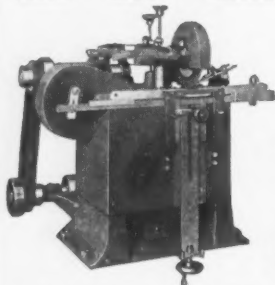
PAYS FOR ITSELF

**With Profits from Resharpening
1 Gross of Hack Saw Blades.**

SHARPENS • RECLAIMS

AUTOMATICALLY

HACK • BAND • CIRCULAR SAWS



Write
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NEW
1960
Catalog
Today

Model EC
Combination
Bench Type

WARDWELL

Manufacturing Co.

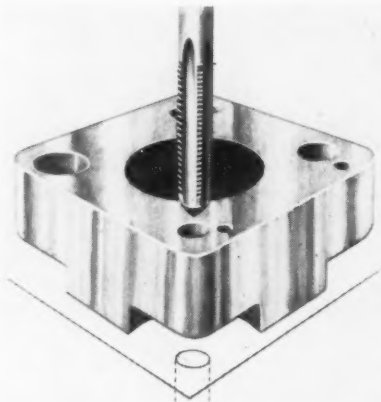
3803 Ridge Road • Cleveland 9, Ohio

For more data circle 531 on Postpaid Card

250 MODERN MACHINE SHOP

MAGNETIC TAP GUIDE

"Little Mag," a new handy, magnetic tap guide, is an easy-to-use precision tool for machinists and mechanics. A powerful built-in, perma-



The "Little Mag" Magnetic Tap Guide

August, 1960

nent magnet holds the guide firmly in position—tap is aligned with hole automatically and accurately. In addition to assuring better tapping on every job, "Little Mag" greatly reduces broken taps.

This compact toolbox item accommodates these standard tap sizes: 1/4, 5/16, 3/8, 7/16, 1/2 inch, No. 8 and No. 10 (special sizes available on request).

The recessed base permits lubrication of tap and removal of chips while tapping. "Little Mag," 2 3/4 by 2 3/4 by 1 3/16 inches, is cast from durable Meehanite metal, cadmium plated and weighs just 1 1/2 pounds.

"Little Mag" is a product of Cling-Surface Co., 1032-1048 Niagara St., Buffalo 13, New York.

For more data circle 163 on Postpaid Card

★ modern machine shop ★

CUT-MACHINING UNIT

Wallace Supplies Mfg. Co., 1804 West Cornelia Ave., Chicago 13, Ill., announces its "Flexi-Modular" Cut-



Wallace "Flexi-Modular" Cutting Unit

August, 1960

POWER!



...FOR LARGE HOLE TAPPING

The New Procnier Tap King represents a major advancement in large hole tapping units. Powerful, dependable, it can tap in steel up to 1 1/8" thick—and hold a class 2 fit with ease! It combines heavy duty ruggedness with delicate precision, to give you the best all 'round BIG tapper for BIG jobs! Operators like its super-sensitive action—management appreciates the many cost-saving features—including longer tap life, consistently uniform threads, fewer spoiled pieces. It consistently turns out more higher quality work in less time, with less effort. Where cost counts and precision is paramount—the TAP KING is the tapper for you!

Write for FREE Circulars

Get the whole story on this remarkable unit, the full line of Procnier Tappers and the New Lead Screw PUSH BUTTON TAPPER. They're Free!



PROCUNIER SAFETY CHUCK CO.

12 S. Clinton St. • Dept. 8 • Chicago 6, Illinois
For more data circle 532 on Postpaid Card

MODERN MACHINE SHOP 251

new equipment . . .

ting Units, which provide the user with many benefits. First, clean cuts on the hardest high speed tool steels of all kinds; second, clean cuts with no measurable metallurgical change in the hardened tools you are cutting; third, it is possible to quickly switch from one job to another with the fast acting, workholding device. The com-

pany states that, with Wallace Cut-Machining (a process which can machine finish as it cuts with enough quality and accuracy for more than half of all needs) it is possible to cut sections at speeds of less than 4 seconds per square inch; surfaces as fine as 50 micro inches can be obtained while cutting; the metallurgical quality of the material will not be changed; it is possible to square or mitre; with special fixtures it is possible to do

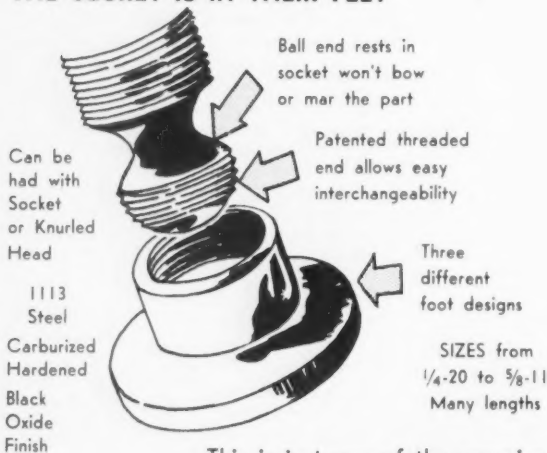
hundreds of jobs formerly done on costlier machine tools.

For more data circle 164 on Postpaid Card

Track Champions and CARR-LANE SWIVEL FOOT SCREWS

have a lot in common . . .
besides being tops in their field

THE SECRET IS IN THEIR FEET



This is just one of the superior Carr-Lane components . . . Get your copy of our latest Catalog



Manufacturing Co.
4200 Krause Court
Saint Louis 19, Mo.

For more data circle 533 on Postpaid Card

CARBIDE CIRCULAR CUT-OFF TOOL

Solid carbide circular cut-off tools for Brown and Sharpe Automatic Screw Machines are available as standard from the Somma Tool Co., Inc., 120 Scott Rd., Waterbury, Conn.



Circular Cut Off Tool

These tools come in a variety of blade widths for the Nos. 00, 0 and 2 B&S machines.

Made with a solid carbide circular cutting blade, brazed to a threaded steel center hub, these plain cut-off tools are not only more rigid, but are said to provide up to ten times the resharpenable tool life of carbide tipped tool.

Other advantages, such as longer wear, better finish, less galling and higher operating speeds, make them most economical on all jobs and particularly on long production runs.

In addition, tools are furnished gashed, so that they can be used for either right or left hand cutting, thereby assuring usage on all jobs.

For more data circle 165 on Postpaid Card

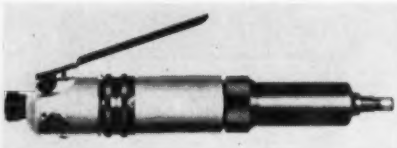
★ modern machine shop ★

AIR OPERATED FASTENERS

Master Power Corp., Bedford, Ohio, has announced the addition of a new series of fasteners to its expanding line of air power tools. It is the completely automatic Torque Limiter, assuring absolute torque accuracy.

With preset fastener control, the Torque Limiter is said to be fool-proof, releasing instantly when the predetermined torque is reached. It has a torque range from 2 to 85 inch-pounds. The unit is interchangeable with both lever and pistol grip models.

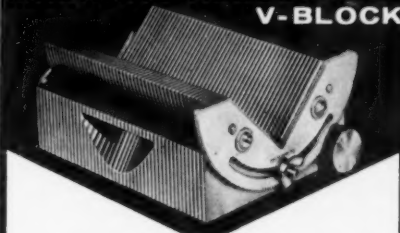
Predetermined torque control prevents damage to screws, nuts or work and eliminates the need for hand torque wrenches. The Master Power



Completely Automatic Torque Limiter

August, 1960

MAGNETIC ADJUSTABLE V-BLOCK



This unique precision workholder permits quick and accurate setups, saving time, effort and money in grinding operations.

Unsurpassed for layout, toolroom and production. Can be used on any machine equipped with magnetic chucks.

COMPARE THESE DISTINCTIVE FEATURES:

- Parallelism: $\pm .00005''$ over entire length
- Maximum setting: 90° angle
- Vernier accuracy: ± 15 seconds
- Size: 6" long, $4\frac{1}{2}''$ wide, $2\frac{1}{2}''$ high

Write today for complete technical data to:

ANTON MACHINE WORKS
1226 Flushing Ave., Bklyn. 37, N. Y.

For more data circle 534 on Postpaid Card

This new MORRISON KEYSEATER can make money for you

Install it in your shop. Its low cost will amaze you. Watch it pay for itself. You can quickly eliminate costly production tie-ups caused by waiting for expensive outside services. This is not an ordinary keyseater. The Morrison Keyseater is quality built with machine



tool accuracy. Practically anyone can operate it. It has automatic feed, automatic stop to cut off feed at given depths, automatic relief to back the work away from cutters, automatic centering, automatic lubrication. NO BUSHINGS REQUIRED. Cuts keyways $1/16''$ to $1''$. FREE new Catalog 714-A shows all features and specifications can be had by writing:

THE D. C. MORRISON CO.

P.O. Box 1017-B
Cincinnati 1, Ohio

For more data circle 535 on Postpaid Card

MODERN MACHINE SHOP 253

new equipment . . .

Torque Limiter has full power in reverse and operates with quiet, smooth accuracy.

This tool is widely used in the aircraft industry.

For more data circle 166 on Postpaid Card

★ modern machine shop ★

GEAR DEBURRING MACHINE

To augment its line of gear deburring machines, The Redin Production Machine Co., 2433 20th St., Rockford, Ill., has introduced a Model 36 Machine. This machine is designed to deburr and chamfer large spur, helical, worm and bevel gears, as well as splines.

It operates on the same principle as the Redin Model 20 Machine. A floating wheel spindle automatically



Redin Model 36 Gear Deburring Machine.

follows the contour of the tooth. No wheel dressing, change gears or followers are required.

The Model 36 Machine will handle external gears up to 36 inches and internal gears to 32 inch pitch diameter. The work spindle will handle a load of over one ton.

The illustration shows a 34½ inch diameter steel gear, weighing about 1,250 pounds, being loaded on the machine. This gear was deburred in a time cycle of two minutes per side. For more data circle 167 on Postpaid Card

"LITTLE BLACKSMITH"

NO. 32 PUNCH



ANGLE SHEAR
ANGLE NOTCHER
STRAIGHT CUTTER
ONE BODY—
4 ATTACHMENTS

K I D D E R

Has made machines for punching, shearing and notching for 58 years. Hand and pneumatic. We can supply punches, dies, shear blades and all parts for any machine we have manufactured.

J. F. KIDDER MFG. CO., INC.

446 COLCHESTER AVE.
BURLINGTON, VERMONT

For more data circle 536 on Postpaid Card

254 MODERN MACHINE SHOP

Jump Edge Finder Locates edge to .0003"



Good Deal For Dealers

ELISHA PENNIMAN

Elmwood 10, Conn.

For more data circle 537 on Postpaid Card

August, 1960

UNIVERSAL MOUNTING BRACKETS

A line of universal mounting brackets, that will adapt Carter Band Saw Guides to any machine, has been announced by Carter Products Co., Inc., 421 Helmer Building, Grand Rapids 2, Michigan.

The company reports that any band saw machine can be fitted with Carter Band Saw Guides for safe and trouble-free operation at any speed or load. The new brackets permit ready replacement of any old style Nos. 2, 1, 0, 00 or three-roller type guide with new Carter Guidall "400" or Micro-Precision Guides.

Upper mountings, providing an auxiliary guide post, have been designed for use where space between post and blade is extremely limited. There are lower mountings for machines with eccentric bushings or offset mounting

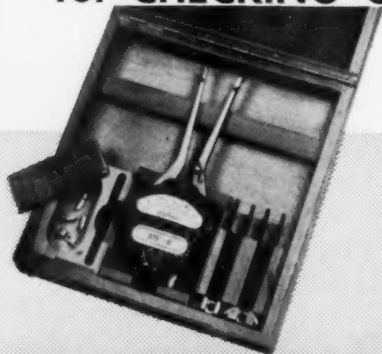


Line of Universal Mounting Brackets

holes, in addition to a special one, using an auxiliary angle mounting bracket.

For more data circle 168 on Postpaid Card

A NEW INTERAPID STAR PERFORMER for CHECKING GROOVES and BORES



- EASY READING
- QUICK SETTING
- TWO AND THREE POINT CHECK
- RANGE: $\frac{3}{8}$ " TO 6"
- INTERCHANGEABLE TIPS
- ALL TIPS HARD CHROME PLATED
- PRECISE REPETITIVE READINGS
- GUARANTEED WORKMANSHIP
- SERVICE HANDLED IN U. S.

Write for more information or phone

BOREL & DUNNER, INC.

19313 Farmington Rd. KENWOOD 3-0878 Livonia, Michigan

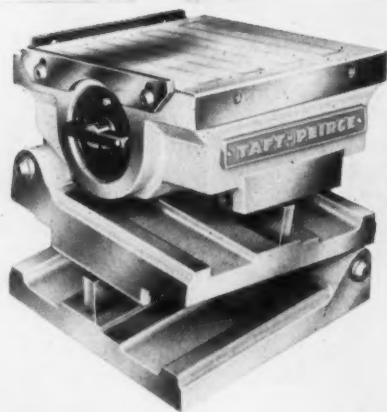
For more data circle 538 on Postpaid Card

new equipment . . .

SINE ANGLE MAGNETIC CHUCKS

Two sine angle models have been added to its line of Superpower Permanent Magnet Chucks by Taft-Peirce Mfg. Co., Woonsocket, R. I. They provide a time-saving, trouble-free means for setting light machining or inspection jobs to either simple or compound angles.

On these models, a control knob on either side will quickly energize the magnetic surface, lightly, for easy positioning of the work, or for maximum grip. Lock screws, which are turned toward the operator, lock the plates at any angle. Angle settings are obtained by use of gage blocks, and a



Super Power Permanent Magnetic Chuck

precision ground step on the base plate makes it possible to set angles down to zero. Back and end stops, both readily adjustable, are provided.

Both chucks feature a powerful rotary pack, which is permanently magnetized and requires no wiring. Tool steel sine rolls are hardened and lapped, and positioned on 5 inch centers within plus or minus 0.00015 inch. They are alike, round and straight within a tolerance of 0.00005 inch, and parallel with each other and the work surface within 0.00010 inch. The precision ground work surface is flat, square with the sides and parallel to the base within 0.0002 inch.

For more data circle 169 on Postpaid Card



TRIAL SAMPLE!

SPECIAL LUBRICANT EASES WORKING STAINLESS AND TOUGH METALS
New lubricant eases stamping and machining operations on the toughest metalworking jobs—takes the problems out of hard-to-work metals such as stainless, high carbon, high chrome, cast iron, monel, etc. **ANCHORLUBE** now used extensively for drilling, tapping, spot facing, counter-boring, milling, fly-cutting, seat forming, engraving, broaching, drawing, piercing, punching, hole extruding, etc. Send today for free trial sample and see for yourself how easy you can work the job with **ANCHORLUBE**.

ANCHOR CHEMICAL COMPANY

Dept. MM-8 • 10721 Briggs Road • Cleveland 11, Ohio

For more data circle 539 on Postpaid Card

For Your Convenience...

the "Where to Get It" section of MODERN MACHINE SHOP provides a quick reference to machinery, tools and supplies advertised in the current issue. Use it consistently. You'll find it's very helpful. (See pages 262, 264, 265 and 266.)

modern machine shop

431 MAIN STREET • CINCINNATI 2, OHIO

BOOSTERS

Boosting ordinary compressed air (80 p.s.i.) up to 3,000 p.s.i. hydraulic pressure without the use of any additional power or need for pumps or motors, S-P's new line of air-hydraulic boosters provides an economical, convenient means of stepping up power for multi-purpose production uses, according to the manufacturer, The S-P Mfg. Corp., 30201 Aurora Rd., Cleveland 39, Ohio.

As pressures increase, the seal effectiveness increases with S-P's multiple-lip self-energizing seals, which have been designed to effect a trouble-free positive seal with a minimum amount of friction and maximum efficiency. The simple, compact design of the booster saves space and permits its use for powering such equipment as spot welders, C-frame riveters, hydrostatic testing equipment, workholding fixtures, bench or arbor presses.

Easy to install, the booster ties in quickly to any handy air line and requires no complicated piping or expensive valves or controls. It can easily be moved from one machine to another to meet changing production needs, adding to its value as an efficient production tool.

Using only air line pressure to obtain its intensified hydraulic pressure, the booster saves production time by stroking up to 200 cycles per minute. It permits accurate, sensitive control and in such uses as workhold-



Air-to-Oil Booster

Attractive
Discounts to Dealers
Write for descriptive folder

The medelton Company, Inc.

Toolmakers • Designers • Dies • Stampings

MORE EFFICIENCY LESS WORK

THE MEDELTON POWERROLL

AUTOMATIC COIL CRADLE

Every Stamping Room Needs One

One man loads it in a minute . . . no hoists . . . coils roll on . . . no lifting . . . no danger of slippage

No operator fatigue on hand-feed jobs . . . slack loop always maintained . . . steady, sure feed . . . spoilage minimized

Less space needed . . . cradle butts against press . . . can be moved to other presses when needed . . . slack stored above cradle

Model R-104 for 10" widths, 1000 lb. coils \$325

Model R-204 for 13" widths, 2000 lb. coils \$405

Model R-304 Handles stock to 24" wide, 48" diameter, weight to 3000 lbs.

Price on application

262 East 3rd St. • Mount Vernon, N. Y.

For more data circle 541 on Postpaid Card

new equipment . . .

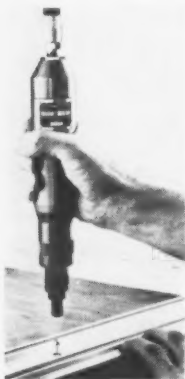
ing or clamping fixtures, it maintains its intensified hydraulic pressure indefinitely with no additional power consumption or generation of heat.

For more data circle 170 on Postpaid Card

★ modern machine shop ★

COMBINATION SCREWDRIVER-NUTSETTER

Airetool Mfg. Co., Springfield, Ohio, announces a lightweight, air powered combination screwdriver-nutsetter.



Screwdriver-Nutsetter

Designated as the Model 420, this tool features automatic push starting to speed assembly line operations. The unit operates at speeds up to 3,000 r.p.m. and is a straight type unit with convenient hand lever control.

Ideal for assembly and fabrication of all plastic, wood and metal components, the 420 adapts readily to the use of several types of screwdriver bits. It is said to

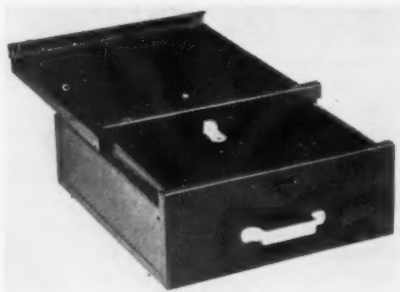
be both simple and easy to convert power bits from screwdriver to nutsetter, right on the job. The 420 is also available with either positive or adjustable clutch to suit specific jobs.

For more data circle 171 on Postpaid Card

★ modern machine shop ★

ALL-STEEL LOCKABLE DRAWER

A simple and inexpensive all-steel drawer, ideal for storage of tools and



All-Steel Lockable Storage Drawer

equipment at work benches and machine stations, is announced by American Metal Works, Inc., Bay Products Div., 1827 West Cambria St., Philadelphia 32, Pa. It is equipped with a backstop to prevent accidental dropping and a hasp which can be padlocked to prevent unauthorized "borrowing." Finish is gray baked enamel. It is supplied complete with hardware and instructions for mounting under

DIAMONDS		DEPENDABLE QUALITY
Carat	Dresser Shank	Price
1/4	Specify	5.25
1/2	Specify	11.50
3/4	Specify	16.50
1	Specify	26.50
2	For large or wide wheels	
	4-5 resets possible	91.50
	Careful resetting in new shank	1.50

WRITE FOR CATALOG

NATIONAL DIAMOND LABORATORY
617 SOUTH ST. PEEKSKILL, N. Y.

For more data circle 542 on Postpaid Card

258 MODERN MACHINE SHOP

AUTOMATIC INDEX TABLES



Continuous motion; skip indexing and uneven indexing available. Diameters from 16" to 80". Avey Division, Motch & Merryweather Machinery Co.



For more data circle 543 on Postpaid Card

August, 1960

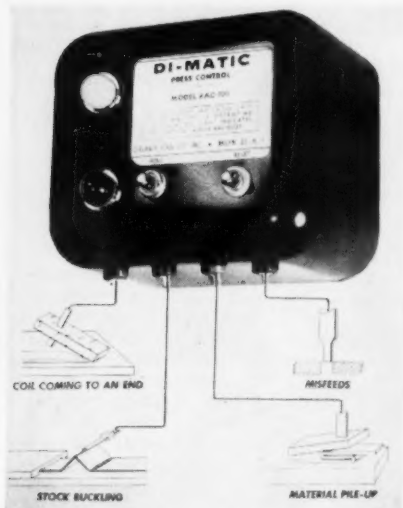
any wood top bench or table or under any steel tray whose flanges turn up. For more data circle 172 on Postpaid Card

★ modern machine shop ★

PRESS CONTROL

Diecraft Tool Co., Inc., 100 Beadel St., Brooklyn 22, N. Y., announces that Di-Matic Press Control is a new type, low cost, electrically controlled, die protection device. Di-Matic disengages the press clutch instantly should material misfeed, buckle, pile up or come to an end. Various models make the unit suitable for both friction (air) type clutches, as well as mechanical (key) type clutches.

Accessories include stock thickness detectors that stop the press before extra-thick metal enters the die; remote control outlets timed with the run-stop motion of the press; misfeed pilots and bushings; lifetime contact switches; and clutch conversion kits. Other units check for non-ejected parts in progressive dies and missing parts in transfer presses and devices. For more data circle 173 on Postpaid Card



Model No. AC-100 Di-Matic Press Control

August, 1960

RED-



CENTERS

Choose from over 250 types, tapers and sizes. Anti-friction or Solids. Cap. to 200 tons, speeds—4,000 rpm.

Here, illustrated, are but a few of the many RED-E Centers. It's a safe bet RED-E has the right CENTER for your miller, spinning, screw or gear cutting machine.

Now simplify and economize with Centers from One Source. Your Industrial Distributor can make immediate delivery.

If you require a special — RED-E has the answer! Write now for catalogs and prices.



180 Garfield Ave., Stratford, Conn.

For more data circle 544 on Postpaid Card

MODERN MACHINE SHOP 259

Invitation

You are cordially invited to visit
Modern Machine Shop
Booth No. 1535
(Second Floor, North Hall)
at The Machine Tool Exposition--1960
International Amphitheatre,
Chicago, Illinois,
September 6-16, 1960

"ONE HOE FOR KALABO"

Sound and color 16 mm. movie film telling what machine tools are and what they do.

Culmination of several years of planning and production by the machine tool industry.

Designed primarily as a public education project.

Copy of film is available on free loan basis for showing to groups. Requests should be directed to Film Editor, Modern Machine Shop, 431 Main Street, Cincinnati 2, Ohio, and should specify the date of showing, the name of the organization requesting the film, the individual to whom the film should be addressed, address and telephone number.

MODERN MACHINE SHOP

BEVERLY *Electric* THROATLESS SHEAR

Cuts Any Shape in Metal
Easily, at High Speed

Provides 1725 cutting strokes per minute . . . correct speed to handle cutting, trimming and slitting operations in any metal to shear's capacity. Unique downward-forward shearing action provides faster, cleaner cutting; insures longer blade life. Operator's hands are free to feed and guide work through shear—permits accurate cutting to a line or template. Throatless design allows sheet to be turned in any direction during cut. Motor operates on 110V., 60 cycles, AC.



Complete with base and supporting column to provide most efficient and comfortable working height from floor. Can be used with base only as bench shear.

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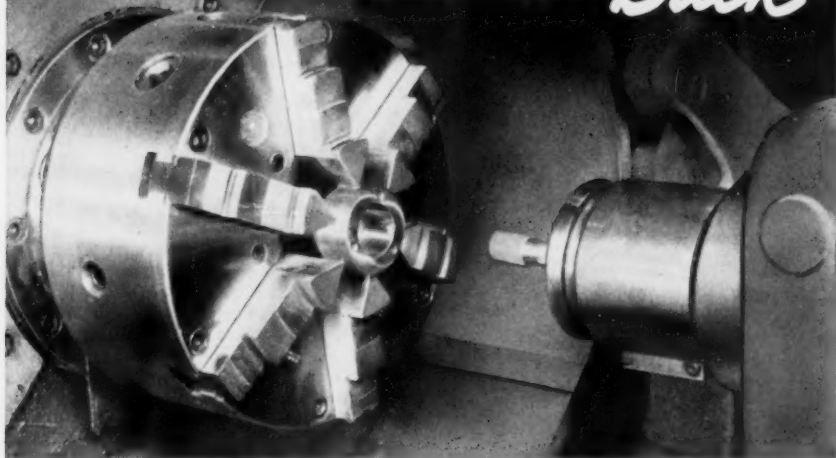
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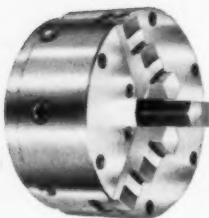
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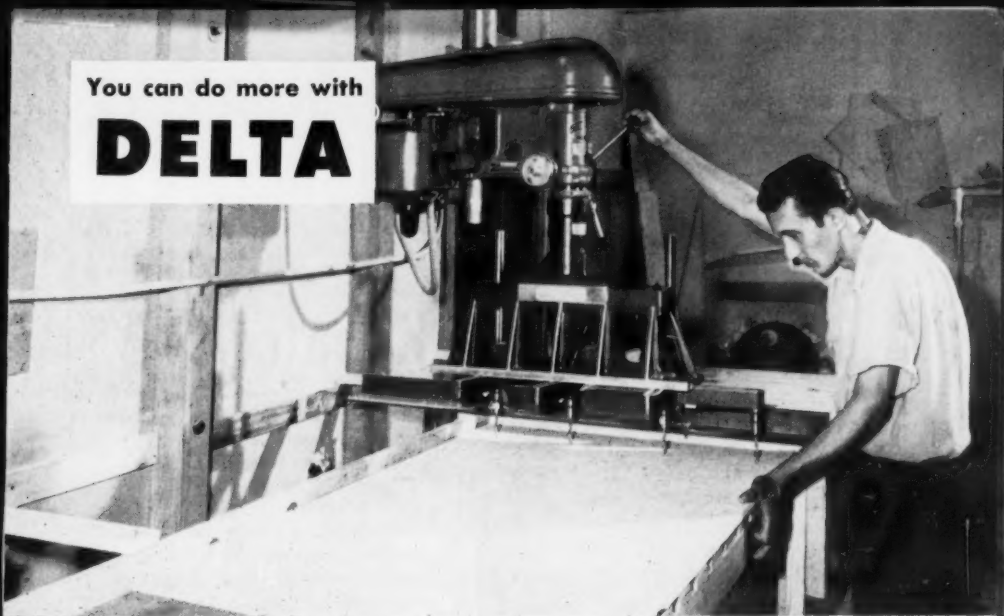
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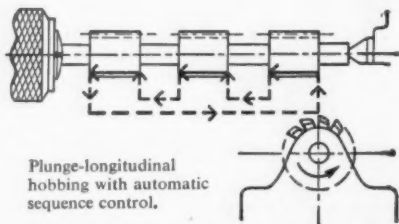
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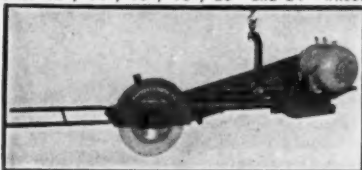
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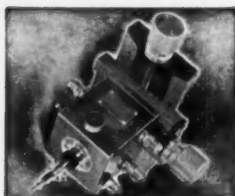
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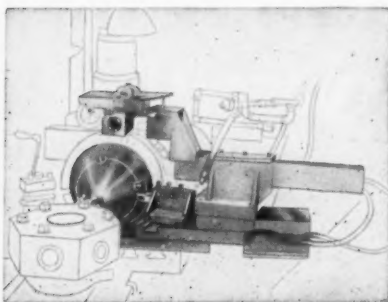
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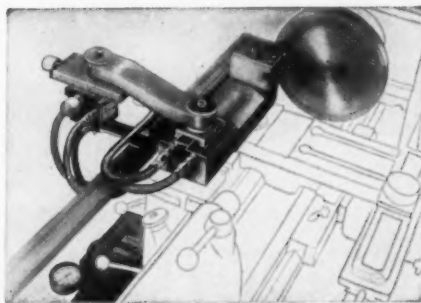


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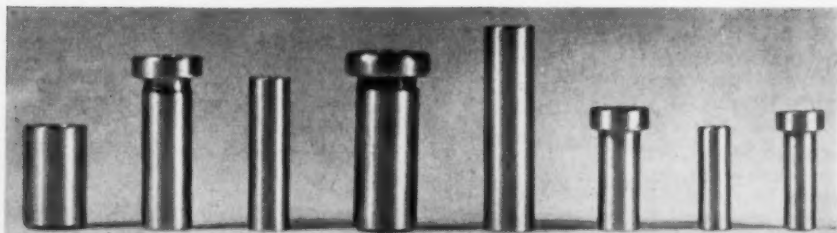
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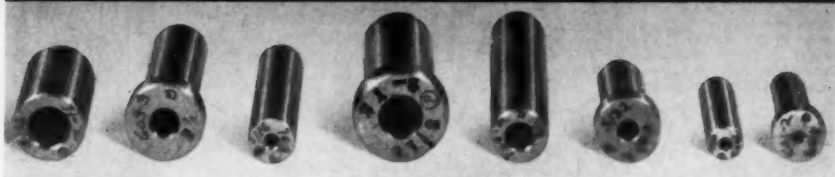
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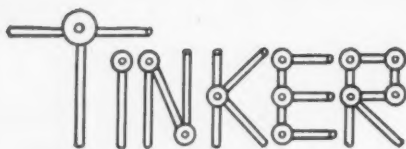
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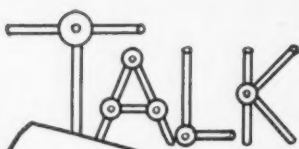
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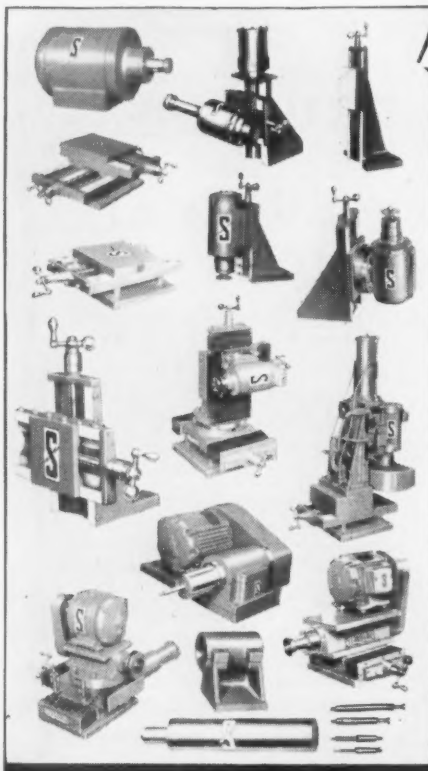
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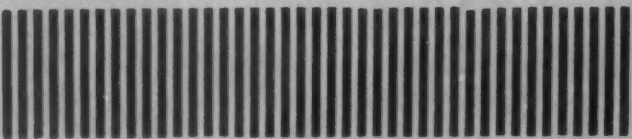
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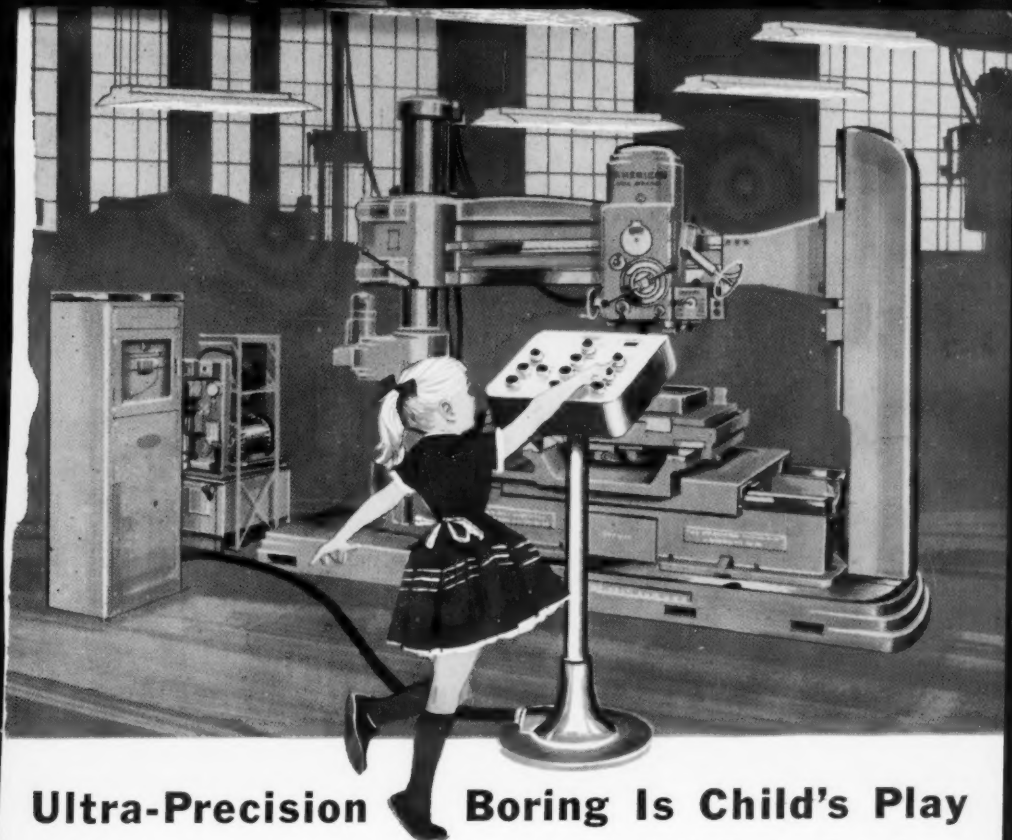
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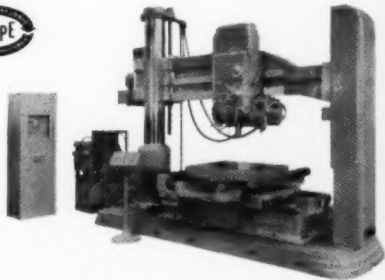
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